THE TRADE REVIEW

AND WESTERN MACHINIST.

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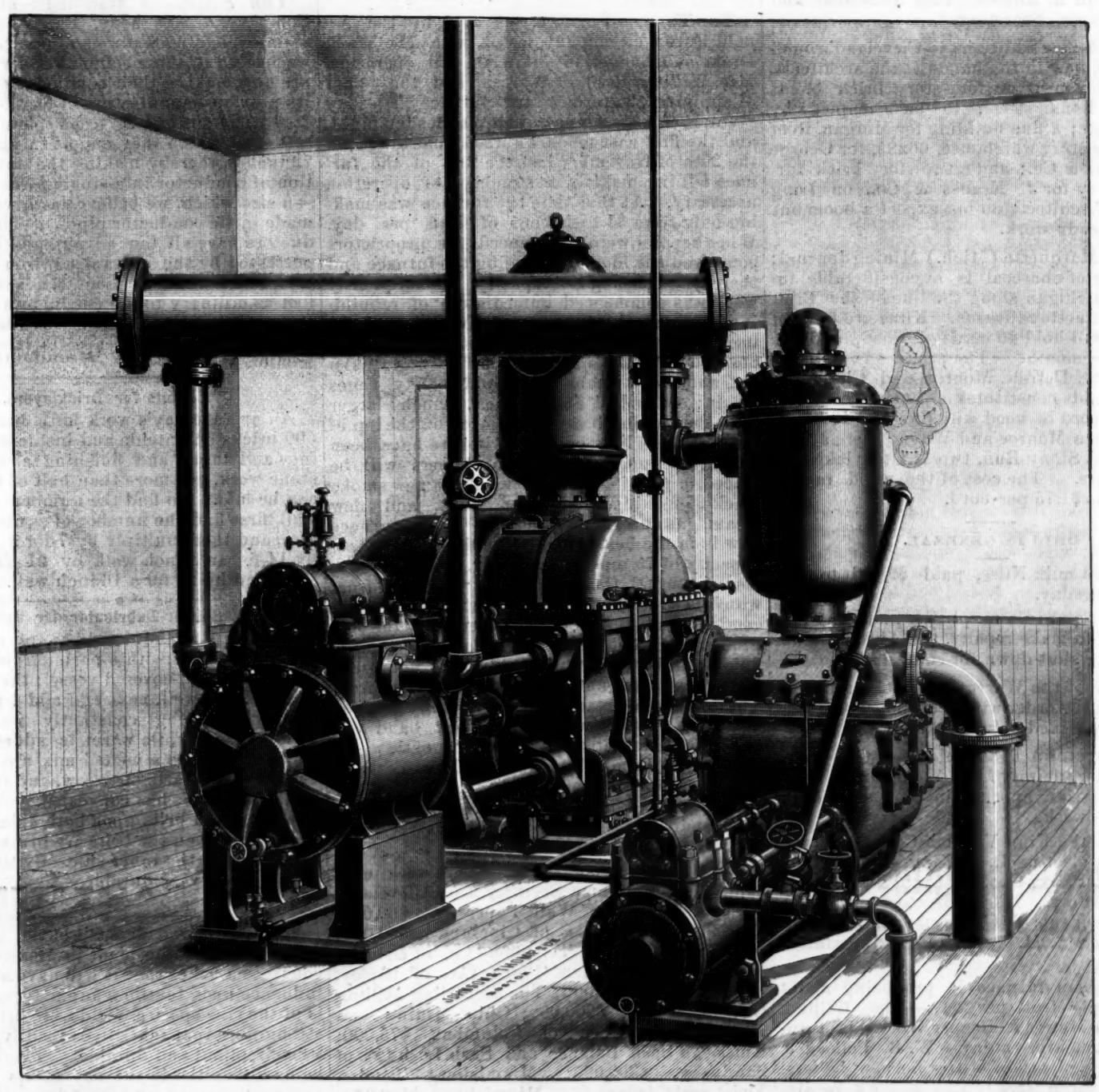
New Machinery.

Deane's High-Pressure Pumping Engine.

There is no one but will be struck by the beauty of the accompanying engraving, as well as the grace, strength and symmetry of the splendid piece of machinery exhibited. It is, as will be seen, a new High-pressure Pumping Engine, with Condenser, and is of importance to every city about to introduce a system of water works or to improve upon their present machinery plant. The particular engine herewith illustrated is a single one, and is thus described by the American Machinist: The steam ends of both pumps are of the regular style used upon the Deane steam pump. The water end, or main pump, is of the inside plunger type, provided with numerous small valves, having an aggregate area exceeding that of the plunger. The diameter of the steam cylinder is 24 inches; water cylinder, 20 inches, with a stroke of 24 inches. Exhaust steam passes from the steam cylinder into the heater, thence to the condenser. The heater is the large cast iron tube shown in a horizontal position over the main pump. By this arrangement the available part of the heat contained in the exhaust steam is used in heating the feed water. Feed water is raised by a pump (not here shown) from a hot well at a temperature of 100 degrees to 110 degrees Fahrenheit, and passes through the heater, leaving the same through the two pipes shown at the left hand end of the heater. This pumping engine is one of a pair which were calculated, when working together, to deliver 4,000,000 gallons of water every twenty-four hours, at a pressure of 100 pounds per square inch. This engine has been in successful use for about two years past, and comprises an efficient part of a large city water works. The engraving here shown was made from a photograph before the lagging was applied. The condensing apparatus used with this engine is shown at the right of the cut, and is of the independent type. The steam cylinders and cylinder heads are steam jacketed with live steam, and the outside is covered with a jacket of asbestos. The makers of this pumping engine, the Deane Steam Pump Co., of Holyoke, Mass., have established a world-wide reputation, and the present product of their mill and ingenuity, bids fair to still further spread their name and fame. They will give additional particulars upon application.



DEANE'S HIGH-PRESSURE STEAM PUMPING ENGINE, WITH CONDENSER.

New Method of Melting Scrap.

A new system of melting iron ore together with scrap, wrought iron, etc., has been devised by Herr Ibruger, an engineer of considerable note in Europe. The cupola of his new furnace, which stands at Norden, is supplied with two sets of tuyeres or ports, one above the other, with 18 in each set. The tuyeres, which have the form of a vertical slot, are directly connected with a circular tuyere ring. The particular feature of the cupola is that at the bottom is a slightly inverted arch, which is pierced by two openings throngh which both blasts, or rather imperfectly consumed gases of combustion, and the fluid from iron can flow. Below is a small chamber in which the iron collects. It is heated by the gases forced downward from the cupola above, which are supplied with thh necessary air for combustion by a special tuyere leading from the main blast pipe. The chamber at the same serves for preheating scrap, etc., which need only be pushed into the bath for dissolving it. Of course, it is well known that considerable quantities of scrap can be used by directly charging in the ordinary cupola; but it is claimed that in this case there is economy of fuel and a greater facility in making sharp, strong castings, and a purer metal. The best iron for this is said to be inferior pig, holding considerable silicon and little manganese. To it from 40 to 50 per cent. of scrap, etc., may be added. The total consumption of fuel is said to be 10 per cent. of the weight of the product.—American Engineer.

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Cupola Performance.

"R. C. W." New Castle, Pa., writes to the American Machinist: I notice in your issue of the 24th ult., the following: "8,800 pounds of iron have been melted in this cupola in one hour and thirty-five minutes, which we consider remarkably good work." Witherow & Gordon, New Castle, Pa. have a cupola 36 inches diameter at bottom, 42 inches bosh diameter, in which the common rate of melting is 10,000 lbs. of iron per hour. The cupala has six tuyeres 6 inches diameter, placed 24 inches to top, from bottom plate. The blower is a "Root." January 27th we put on blast at 4:30; melted 10,000 lbs. iron at the rate of 10.25 lbs, of iron to 1 lb. of Connellsville coke, and dropped bottom at 6:30 P. M.

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Manufactures.

OHIO INDUSTRIES.

CLEVELAND.

THE Mesnard Iron Co. holds its annual meeting in Cleveland March 10.

NEARLY all the stock ($200,000) for a new National bank in this city has been subscribed.

MR. FAYETTE BROWN, of this city, Receiver for Brown, Bonnell & Co., Youngstown, hope to have the mills running by March 5.

THE police census of Cleveland, just finished, shows 575 manufacturing blocks; 31 brickyards; 6 ship yards; 182 vessels at docks; 49 cooper shops, etc.

THE Dangler Vapor Stove Co., of this city, have recently more than doubled their manufacturing facilities in order to meet the constantly increasing demand for their celebrated non-explosive vapor cook stoves. This is one of the oldest manufactories of vapor stoves.

THE stockholders of the Export Manufacturing Co., met at the Kennard House Monday afternoon, and elected the following board of directors: W. J. McKinnie, R. R. Rhodes, Douglas Perkins, George W. Short, Samuel L. Mather, Thomas Axworthy and D. McClasky. The directors oraanized as follows: D. McClasky, President; R. R. Rhodes, Vice President, and Herman Mayer, Secretary.

AMONG the new additions to Cleveland's business blocks, now in the hands of the architects, are the following: A four-story brick block, 40x100, on Bank street, to be occupied by Isom & Foote; a fine building for Morgan, Root & Co.; a five-story warehouse, 66x95, for George Worthington & Co.; and a two-story brick furniture factory for J. Krauss & Co., on Long street, etc. Architects do not expect a boom but plenty of steady work.

SAYS the Marquette (Mich.) Mining Journal: The making of charcoal is a considerable industry in Michigan along the line of the Flint & Pere Marquette railroads. Kilns are built of brick that will hold 40 cords of wood, and are filled twice a month. The product is shipped to Wyandotte, Detroit, Monroe and Cleveland. Twenty pounds constitutes a bushel of charcoal, and a cord of wood will produce 40 bushels. Between Monroe and Wayne there are 43 kilns; five at Stony Run, two at Otter lake and eight at Sears. The cost of the wood ranges from $1.30 to $1.75 per cord.

OHIO IN GENERAL.

THE Russia mill, Niles, paid $9,652 to employes Wednesday.

IN order to put in a new boiler and other machinery and to make repairs, the Akron Steam Forge will be shut down for some days.

THE works of the Warren Paint Co. are now in good running order with a capacity of three tons of ready mixed paint per day.

THE Youngstown Malleable Iron Co., one of the most enterprising of the Youngstown flourishing industries, appears in our advertising columns this week.

SATURDAY, the King Varnish Co., of Akron, organized by electing D. L. King, A. M. Armstrong, D. R. Paige, Geo. W. Crouse, and A. L. Conger, Directors. The Directors elected D. L. King, President; J. G. Raymond, Secretary and Treasurer, A. M. Armstrong, Superintendent.

THE Struthers furnace is producing about 120 tons of pig iron per day.—The William Anson Wood Mower & Reaper Works is turning out 100 machines a day.—W. B. Pollock & Co. are having plenty of orders for new boilers. Tney have a large force of men at work repairing and rebuilding the Mary furnace at Lowellville.—[Youngstown News-Register.

A broken cylinder head in the press at the Sewer Pipe Factory, delayed work a number of days this week.—The Wire Co. will start Monday, running by means of their new engine, placed permanently in the mill at a cost of about $2,500.—Last week we announced that the Cuyahoga Forge and Iron Co. are to rebuild the Pearl Flouring Mill, and make a first-class establishment of it. Later intelligence is to the effect that the present mill is to be made six feet higher, and a large addition placed in front of it, with entrance on the south, preparation for the foundation of which is already in progress. The new mill, which will have a capacity of 100 barrels daily, will be equipped throughout with finest milling machinery.—[Cuyahoga Falls Reporter.

THE Lechner Manufacturing Co., of Columbus, report to the TRADE REVIEW in reply to inquiries that they are running full time with orders beyond their capacity; that they are constantly adding new machinery; that they were to ship this week ten Lechner coal mining machines, to the Pratt Coal & Iron Co., Birmingham, Ala.; that they will also make shipments of similar machines next week to the Sunday Creek Coal Co., Corning, O., and to the Pioneer Coal Co., Malden, West Va.; that their orders for these machines are two months ahead of them, and that in their chain business they are filling, orders for their malleable detachable chain and for steel rolled chains, for transmitting power, elevators, conveyors, &c., from every State in the Union. They have just made a shipment of more than 1,000 pounds heavy steel chain with wheels, shafting, &c., to the Nashville Cooperage Co., Nashville, Tenn., for a conveyor to take hogsheads of tobacco &c., from steamboats on to the landings.

THE Thomas Furnace, operated by the Arnold Furnace Company, lessee, with Mr. W. R. Drake as manager, is again in full operation. Mrs. William Reed, of Warren, had the honor of applying the torch to the furnace Tuesday evening, the blast was put on Wednesday night, and the first cast made Thursday morning. On the 20th of November last the top of the furnace fell in, making a stoppage of operation necessary. At that time the furnace was making only from 35 to 40 tons of iron per day. When repairs were commenced the proprietors conceived the idea of enlarging the furnace and thereby increasing its capacity. Consequently work was commenced immediately of rebuilding. The stack of the furnace was raised fifteen feet, making it now 70 feet high with a bosh 16 feet; the old water hoist was taken out, and a new steam hoist and safety cages put in; a new bell and hopper, much larger than the old one, have been placed on the top of the furnace. New battery of boilers have been added, and another new set of boilers will be placed in position in a few weeks; a new smoke stack 85 feet high has been built, and new steam, gas and air pipes added. The furnace now is in the best possible condition, and has a capacity of 75 tons of iron daily. The furnace manufacturers the celebrated "Arnold" iron, which is a soft, strong all ore foundry iron, combining all the peculiar properties of the best grades of Scotch foundry metal, as regards fluidity and softness, with nearly, if not quite the strength of number one Bessemer iron. These favorable results are attained by the use of the famous Mineral Ridge black band ore, and the celebrated Arnold magnetic ore from the Adirondack mountains, New York. It excels any other iron now in the market for stove plate and light machineca stings.—[Niles Independent.

NEW PROJECTS.

NEW Ohio incorporations the past week, with capital stock: Home Security Co., Cleveland, $50,000; Cleveland Wall Paper Co., $60,000; Queen City Iron Co. of Cincinnati, $60,000; Mexican Inter State Telephone Co. of Urbana, $200,000; Valley Gem Piano Co., of Ripley, Brown county, $30,000; The Sieberling Milling Co., of Akron, $200,000; Ohio Mining and Manufacturing Co., of Columbus, $75,000; American Sash Balance and Sash Lock Co., of Sandusky, $300,000; Miamisburg Binder, Twist and Cordage Co., Miamisburg, $100,000; Ashland Manufacturing Co., Ashland, $100,000; Forest City Ice Co., Cleveland, $150,000; Billings, Taylor & Co., Cleveland, (colors, varnishes, chemicals, dyestuffs, &c.) $100,000; Railway Building Co., of Cincinnati.

ADJOINING STATES.

DUNCAN & BALDWIN'S new stove works in New Castle will start next month, employing 200 men. The patterns and machinery will be removed from Pittsburgh.

THERE are ten blast furnaces at Sharpsville, all of modern style and fitted with all the latest improvements with a producing capacity of nearly 200,000 tons per year.

THE Taper Sleeve Pulley Works, of Erie, Pa., are making a 96x24-inch clutch pulley to run a gang for the Jesse Hoyt estate at East Saginaw, Mich. They are also making a 108x24-inch clutch to run a gang in a new mill at Red Wing, Minn.

THE Crawford Iron Works, Meadville, Pa., have lately brought out a new patent eccentric mandrel, a cross head pin turner and a cylinder machine. The eccentric mandrel is said to be a splendid thing and warranted to save 50 per cent over the old style of turning eccentric. The REVIEW is promised the first cuts of these new machines.

THE REVIEW learns that A. Northrop & Co., Pittsburgh, manufacturers of sheet iron rooling, are getting up a fine trade on their patent paneled ceiling and holding their own in iron roofing though at this season of the year the roofing business is naturally quiet. They have the new Lewis block to ceil in Pittsburgh, and the new buildings of the Buffalo Express, requiring about 40,000 square feet together, besides a number of smaller buildings.

THE Solderless Standing-Seam Conductor Company, of Allegheny, Pa., whose standing-seam expanding water conductor or rain spout we noticed in these columns some months since, are now making their conductor (in addition to its previous manufacture of best bloom galvanized iron) out of I X terne plate made from soft steel, which they import in sheets of 30 x 72 inches, thereby making the full 6 foot section of conductor in a single piece of tin plate —a size which, we believe has never before been made in tin conductor pipes. These tin conductors have all the advantages of expansion possessed by the galvanized iron of this pattern, and are sold at about the same price per foot as ordinary round conductors made of I X charcoal tin plate. Some architects, in fact, specify them in preference to the galvanized iron ones.

Points for Bricklayers.

An average day's work for a bricklayer is 7,500 bricks on outside and inside walls; on facings and angles and finishing around wood or stone work, not more than half of this number can be laid. To find the number of bricks in a wall, first find the number of square feet of surface, and then multiply by 7 for a 4-inch wall, by 14 for an 8-inch wall, by 21 for a 12-inch wall, and by 28 for a 16-inch wall.

Rubber Lubricator for Belts.

Five parts of India rubber are cut fine and melted together with 5 parts oil of turpentine in an iron, well-covered vessel; then add 4 parts of rosin, stir well, melt and add 4 parts of yellow wax, stirring constantly while melting. This mixture while warm is added with constant stirring, to a melted mixture of 15 parts fish oil and 5 parts of tallow, and the whole is agitated until it has congealed. The mass is applied to old belts upon both sides in a warm place, and when the belts are in use, from time to time upon the inner side. By this treatment they become very durable.—Chem. Centralblatt 1882, p. 768.

MEXICAN newspapers tell of the discovery of a new fibre-yielding plant in Mexico, which encourages a belief that it will have an important influence upon textile manufacture. The plant is of the vine species, yields a brilliant, fine, strong fibre that takes dyes readily and is extremely pliant and durable. There are said to be no difficulties in the way of its preparation and manufacture, and the fabric made from it closely resembles silk. If correctly described, this new vegetable addition to the list of textiles will add largely to the already abundant natural resources of Mexica. The plant will probably flourish in other lands of like latitude and temperature if transplanted.

SEND for specimen copies, free, of the TRADE REVIEW.

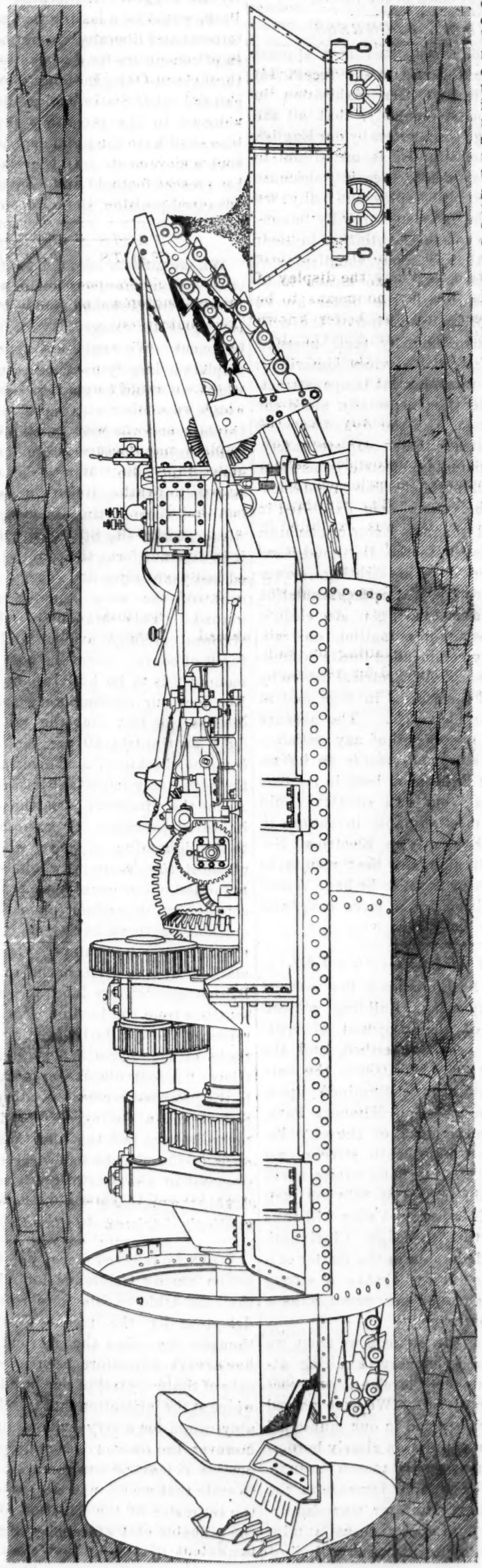
Engineering.

Beaumont's Boring Machine.

To the *American Engineer* we are indebted for the following very plain and comprehensive engraving, showing the appearance and working of the Beaumont Boring Machine, now being used in the preparatory works for channel tunnel between France and England. The illustration originally appeared in the *Railway Engineer*, of London, accompanying a paper read at the Academie des Sciences, by MM. Daubree and Raoul Duval, from which we take the following extracts:

Instead of boring by blasting, as in the Mount Cenis and St. Gothard tunnels, Col. Beaumont's machine gouges out at one revolution a perfectly cylindrical hole 7 feet in diameter, in precisely the same manner as an immense centre-drill. The nature of the strata through which the submarine tunnel passes, by reason of its homogeniety and comparative softness, allows the work of boring to be continued in this manner. Already on the English side the chalk has been pierced to a distance of about 2,000 yards with a Beaumont machine. The machine, constructed in France, has various improvements, which it is hoped will still further increase its utility, which has already proved so satisfactory in England.

The tool of the Beaumont machine is in the shape of a T, of which the cross part carries a series of cutters fixed like the heel-tool of a lathe or planing machine; these cutters, by the revolution of the cross-piece, tear the chalk. The length of



THE BEAUMONT BORING MACHINE.

the cross-piece is equal to the diameter of the hole to be bored. The machine consists of two parts: first, the frame, which is at rest while the machine works; second, the boring machine and motor, which advance gradually upon the frame during the operation by means of an arrangement to be presently described. When this second part has arrived at the end of its travel it can be fixed, while the frame advances in its turn over the ground already traveled by the machinery, so as to place the two parts in the initial positions which they had at the commencement of the operation.

The frame is formed in the segment of a circle, of strong plates and angle irons, nearly equal in diameter to that of the hole to be bored, and rests with a little play upon the lower part of the hole pierced by the machine. This frame is provided with sliding surfaces upon which the machinery can advance or recede. The trunk of the T-shaped tool is formed of steel, and very strong. It receives its rotary motion from the axle of the engine through a series of toothed wheels, which gradually reduce the speed. This engine has two cylinders, and is driven by air compressed by Prof. Collaton's apparatus to an effective pressure of two atmospheres. The rotary motion of tool box is accompanied, as before mentioned, by a forward motion, and which is produced by hydraulic pressure; for this purpose the end of the long steel shaft is connected with the piston of a double-acting hydraulic ram fixed to the frame. The water pressure is obtained by means of a small pump worked from the engine, and this, acting upon one of the faces of the hydraulic piston, keeps the cutters in their revolution against the face of the chalk and carries the shaft and machinery forward upon the sliding surfaces attacked to the frame. The debris is collected in spaces behind the cutters in a tool box, which in its revolution sends it out of the funnel at the center of the shaft into an endless chain of buckets, which carry it to the rear of the machine and empty it into wagons placed for that purpose. As soon as the tool has traveled about 4½ feet the engine is stopped. The whole of machinery is then raised by a system of screwjacks, in front and rear, to the height of about one inch. The compressed air is now admitted upon one of the faces of the hydraulic piston, so that by the action of the pump upon the other face, the frame (which by the raising of the machinery is suspended upon it) slides beneath it until it attains the position it occupied with respect to the other before the commencement of the operations. The screwjacks are then released and the apparatus is ready for a further advance. The work of moving the lower frame is very simple, and takes but a few minutes.

The pressure of the air is calculated to give the engine shaft a speed of 100 revolutions per minute, which is reduced for the tool to 1½ revolutions; the hydraulic apparatus gives an advance of about 1 inch per minute, according to the hardness of the strata where the boring is taking place. By taking into consideration the time spent in fixing the machine at the end of each travel, the rate of advance under these conditions will be an average of 3¼ feet per hour, which is a very good result.

The machine working on the English side, which less perfect than that the above, advances at the rate of 590 feet in 24 hours.

National Railway Exposition Items.

ALREADY tens of thousands of feet have been assigned in the principal annex.

NEARLY all the space in the main building, although 800 feet long, 200 feet wide, and with a gallery a third of a mile long, is already taken.

THE advantages to result from the opportunity of taking part in the national display are so fully appreciated that a large amount of money —in some cases running from $1,000 to $20,000 —will be expended by exhibitors in arranging and beautifying their exhibits.

AN interesting feature will be the extensive exhibit of iron ores from different sections, which will be under the supervision of the Northwestern Association of Iron Ore Producers. A fine collection of copper ores from the Lake Superior region is also being prepared.

HON. LUCIUS FAIRCHILD, president of the Board of Commissioners, is now in Europe, and his high reputation as a representative of the United States government for many years in Great Britain, France and Spain, will greatly aid in increasing the interest already manifested in the Exposition.

THE suggestion has been made by one of the intending exhibitors that the Exposition will form an excellent occasion for starting at Chicago a school of technology for the education of the sons of working men in the mechanic arts. It is believed that many of the exhibitors of tools, wood-working machinery, etc., would gladly donate a portion of their exhibits for such a purpose, thus forming the nucleus of a complete outfit of the best and most modern appliances.

A railway officer in Nova Scotia has taken the pains to hunt up for the Exposition, what he says are "the first engine and passenger car in America." This engine, which is said to be the second or third built for Stephenson, is certainly a curiosity. A brass plate on the boiler bears the inscription, "Timothy Hackworth, Sheldon, Durham, Aug., 1839." The engineer and fireman are situated one at each end of the boiler, an iron arm chair being provided each for their convenience, but they have no protection from the weather. The tender is attached to what in modern engines would be the pilot end of the boiler, and the cylinders are situated above the rear driving wheels.

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To Machinists, Manufacturers and Others.

THE publishers of the TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinists and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own language, as all such contributions will be properly revised before sending to press.

☞ When writing to any of our advertisers, please say that you saw their advertisement in the Cleveland TRADE REVIEW.

MECHANICAL SCHOOLS.

How many strictly mechanical schools does the reader think exist in this country? We turn to New York and find—not one. The Cooper Institute teaches boys and girls drawing, engraving and modeling but not a word of manufacturing processes. Other metropolitan organizations furnish instruction in that useful branch, draughting, but negiect the practical part of the boy's training. The Technical School of the Metropolitan Museum of Art comes the nearest giving a mechanical training, in its class in carriage designing and construction, but its field is necessarily limited. Philadelphia is worse off than New York. Dainty designing, fruit-modeling and needle-work seem to be the height of its ambition in the direction of art industries. Boston does better in furnishing a school in mechanic arts connected with the Institute of Technology, wherein instruction in iron and wood-working is given. The school is modeled after that at Moscow, Russia, and each student keeps or sells what he makes. Urbana, in our own State, has a university with a course in carpentry and joinery, metal and stone work, bridge trusses, etc., but unfortunately it has few students. Lowell, Mass., looks after its apprentices in the textile fabric industry, but no more. Cleveland is paying some attention to the matter, more definite reference being reserved, however, for a future article. Other cities make some art pretensions and even teach a little engraving on wood, but that is all.

Undeniably the drift of technical education must change—has already changed—in the direction of more definite instruction in the different trades. The old apprentice system has gone, never to return. The Mechanical Schools of the future must supply its place. They cannot turn out finished mechanics, perhaps, but they should at least, as has been decided in the case of an industrial school in Springfield, Mass., give a boy a knowledge that will enable him to choose a pursuit, and will train his brain and hand to wrestle successfully with the difficult problems of the work-shop. More than this should not be attempted; less than this is a comparative waste of time. We welcome, then, the Mechanical School as an index of the combined mechanical intelligence of the age and a bright omen of the future.

ELECTRICAL PROGRESS.

What we more than suspected now appears conspicuous in connection with the recent International Electric and Gas Exhibition in Crystal Palace, London—namely, that all the glory is given the gas appliances by our English exchanges, while small praise is meted out to the electrical department, ostensibly because there was an inadequate display but really, we surmise, because the gas men shrewdly managed things so as to run the Exhibition in their own interest. Be that as it may, the display of electrical appliances was by no means to be despised, albeit nearly all the better known companies (probably getting wind of the drift of things) were conspicuous by their absence. We mention a few of the devices described: Gulcher's arc and incandescent lamps attracted considerable attention, especially since the wires connecting them with the dynamos were left bare to demonstrate their complete safety. Ferranti's lately patented electric generators justly excited much interest. The "fundamental principle of the dynamo" was exhibited in Woolrich's original magneto electric machine. Decidedly interesting were the Berthoud-Borel electric cables for electric lighting. power transmission, telegraphy, etc., perfect insulation being obtained by a lead casing. An electric lock and block system of signalling on railways was especially commended for its simplicity and effectiveness. An electrical device by which trains signal themselves in fogs and at night is given favorable notice. The absence of effective electric meters and of any satisfactory exhibit of the storage system is to be regretted. Had the Exhibition been in its true sense "international," our own country could have entered some most valuable inventions in this department. Evidently an Electrical Exhibition such as will show the best results of recent inventive genius is yet to be had. Where can such an Exhibition find a more congenial atmosphere than in America?

EXPOSITION BUILDING—YES.

We congratulate St. Louis upon the assured success of her Exposition Building project. Already $483,000 of the proposed $600,000 guaranty fund has been subscribed, and the immediate expenditure of $450,000 on the bare buildings has about been determined upon. The building will be placed in Missouri Park, which is situated in the heart of the city beween Thirteenth and Fourteenth streets, east and west, and Olive and St. Cloud streets, north and south, embracing an area of 333x508 feet. The Capital of the Mississippi Valley will thus take equal rank with Chicago, Cincinnati, Pittsburgh and Philadelphia in the matter of a permanent Exposition and will make a strong bid for the maintenance of her prestige as a leadng industrial center.

While we are upon the subject, we trust we shall not be considered visionary in calling attention to the advantages Cleveland possesses for a permanent Exposition. We have passed the "overgrown town" period in our municipal existence and with a population closely bordering upon 200,000 may with reason assume metropolitan airs. The rapid increase in the number, variety and extent of our manufacturing establishments; our importance as a mineral entrepot, and our unsurpassed shipping facilities have given us an industrial pre-eminence which we shall continue to hold—unless more enterprising cities take it from us. An Exposition building—shall we have the temerity to suggest it?—located in Monumental Park, would be a lasting testimonial to our enterprise and liberalty; would become the Mecca of consumers for a wide stretch of territory throughout Ohio, Indiana, New York, Michigan and other States, and would beyond doubt redound to the pecuniary profit of the men who shall have the public spirit to inaugurate such a movement. If Cleveland would retain her present foothold and continue to take an advanced position, she must contend for it

FACTS vs. THEORIES.

WE are glad to be able to coincide with the *American Artisan* on some points of the tinplate controversy, and can well afford on others to "agree to disagree" with so honorable an opponent. We would not ignore the fact that tinplate is largely used in the canning industry which we would be glad to see protected to an extent consistent with equal protection for the tinplate manufacture in this country, which, under unjust discrimination, has been so sadly starved to death. But we call attention to the fact that of the aggregate drawback of $1,011,000 on exported tin, last year, $792,742 was withdrawn by the Standard Oil Co.; or to put it in different form, the canning interest exported last year only a little over one-tenth of 1 per cent. of the total number of gallons sent abroad. This branch of the subject the *Artisan* carefully avoids, and in so avoiding it of course cannot see how a tin importers' monopoly is to be built up by a reduced duty. Nor does our contemporary seemingly care to discuss the fact that the tariff bill puts the duty on tinplate 60 per cent. lower than on common sheet iron, thus discriminating against the admittedly important iron-roofing industry. As for the "burdens upon the people," new and improved processes of manufacture will look to the lightening of these, while the adoption of the *Artisan's* theory would tend only to the reduction of our country to a mere agricultural community, dependent upon England for all our manufactures, having no inherent power of national growth whatever. Indeed, the course marked by the *Artisan* is exactly what our British competitors long for, as witness this sentence from the London *Hardware Journal's* report of the quarterly meeting of the tinplate trade of the South Wales and Midland districts: "A long discussion ensued with regard to the proposed increase of duty in the United States, and a feeling of gratification was expressed at the fact that the Committee on Finance of the Senate had decided against the proposal of the Tariff Commission to nearly double the existing tariff, which would be *exceedingly detrimental to the English trade.*"

WHEN we referred recently to the sudden cessation among Columbus lobbyists, of the cry that the Ohio canals were ruined beyond redemption by the recent floods, we had no thought that that the Akron *Beacon*, which has always heretofore been a consistent advocate of State control of our public works, would wince at the intimation that the clamor was probably raised for a very evident purpose. Since, however, the *Beacon* does appropriate to itself a portion at least of our remarks, it may be well to state that we do not accept as gospel truth the estimates of the Chief Engineer regarding the probable cost of repairs, but we will go to the extent of saying that should the amount

exceed his estimates by 15 or 20 cents or so, we would not count it any extravagance to be compared with the surrender of these valuable works to the hordes of cormorants that are trying to filch them from the people. On the contrary, the State (that is, the shippers and their customers, the people) can well afford to expend twice $13,000 rather than lose the canals. Of course nobody proposes to assist in, or allow any job, big or little, and if the Board of Public Works, ably assisted by the Legislature, and closely watched by the *Beacon* and REVIEW, can't come within a thousand or two dollars of the probable expense before voting the money, they had better go out of the business. Don't you think so?

THE first of several interesting, practical and instructive papers on foundry topics is given in this issue. The author is Mr. Thos. D. West, the well known foreman of the Cuyahoga Foundry, this city. The papers originally appeared in the *American Machinist*, New York, and were then, after revision, published in book form under the title, "American Foundry Practice," by John Wiley & Sons, 15 Astor Place, New York. The original *Machinist* articles are now revised by Mr. West for the TRADE REVIEW AND WESTERN MACHINIST, and suitably embellished with cuts, through the courtesy of the Messrs. Wiley. The REVIEW hopes soon to perfect arrangements whereby the volume, of which these articles are simply extracts, shall be offered as a premium to subscribers to this paper.

THIS sort of thing being the order about these times, we desire positively to assert, without equivocation or concealment, that not a dollar or a nickel's worth of stock in the TRADE REVIEW is, has been, or ever will be owned by the Standard Oil Co., directly, indirectly or remotely, all reports to the New York *Times*, the London *Times* or any other paper to the contrary notwithstanding.

CLEVELAND is growing at the rate of about 9,000 a year. Her recent police census shows a population of 194,648, so that if she has not already touched the 200,000 point, she will do so during the present year. During the past four years the city has increased in population over 43 per cent. It is evident that we are rapidly forging up alongside Cincinnati. Will we pass her?

NEW YORK, jealous of the importance of Bradford and Oil City as oil centers, propose to consolidate the New York Mining Stock, New York Petroleum and National Petroleum Exchanges into one body, and thus to control the market. Cleveland still remains the center of the refining interest of the world, however.

The TRADE REVIEW seems to have an unfortunate way of stirring up some of its contemporaries. All right, brethren; talk back to us, if you want to—we'll convince you of our desire to be courteous even if we can't always convince as to the fallacy of your arguments.

AND now the cry is raised that large quantities of steel rails of inferior quality have been thrown upon the market. The Indianapolis *Journal*, which makes the charge, certainly owes it to the trade to name the mills these defective rails come.

PUNCH'S advice to the young man on the subject of matrimony might be well for the gentlemen who propose starting an Oil Exchange in Cleveland: Don't.

That Tin Importers' Monopoly.

[From the American Artisan.]

The Cleveland TRADE REVIEW, in a fair and temperate reply to our strictures on its position on tin-plate duty, closes its article in terms to which the American Artisan most heartily subscribes, as it desires "to take no narrow view of this matter, and has no quarrel with tin-roofers, iron roofers, gravel-roofers or any other kind of roofers." Thus according to the REVIEW the simplest and most equitable rule as to these various interests would be:—If the tinplate duty goes down, then lower that on sheet iron, but, better yet, equalize them at a figure that will not prove onerous to any interest and at the same time will afford sufficient protection to put the tinplate industry of the United States on its feet again and give it a boost toward prosperity.

To this no fair-minded person can object. The only difficulty is to find the just medium referred to, and it is with this that Congress and the country are wrestling. Our position is that the tariff on tinplate should not be increased at the present time as it would prove to the extent to which it is levied a burden upon the whole people and upon those industries that use tinplate as their raw material. We are well aware that the question of what is raw material is often a point in dispute, but still it cannot be denied that tinplate is the raw material for roofers, tinners, canning establishments and the like, and the position of the American Artisan is a sound and tenable one, the TRADE REVIEW to the contrary notwithstanding. To advocate low tariff or taxes (for a tariff is nothing but a tax) on that which enters into every household as a prime necessity, and that the raw material of important industries should not be burdened, is surely not monopolistic. What would become of our immense export canning trade in meats, fruits, lard, fish and vegetables, if they were handicapped by an increased cost of tin, equal to and perhaps exceeding their present profits.

Our cotemporary claims that we favor a gigantic tin importers' monopoly. Just how even the removal of the duty on tinplate could make an importers' monopoly, any more than now exists, the REVIEW does not condescend to explain. It surely does not mean to claim that there is anything like monopoly now, when competition is causing the cutting of prices in all directions, and since all the tinplate is now imported, no change of duty would materially affect the quantity to be sold; so we fail to see how a monopoly could be built up.

Square Rope Belts.

English milling engineers are introducing square rope belts, which are said to be very suitable for transferring power. They are made in strips with "step" joints, screwed together; the sides of the rope leaving the pulley groove without loss of power. It is stated that a 1½ inch rope, at 4,000 feet a minute, has driven over 100 horse power.

The Best Machinery Oils.

Among lubricating oils, fine mineral oils stand first on the list of those which adhere well to metal surfaces, but are without perceptible molecular cohesion. Sperm oil stands second; neatsfoot third; and lard oil fourth. This is the order of their fitness for use on machines.

GOLD-mining and diamond mining in South Africa seem for the moment to be equally under a cloud. The latest reports say that it is almost impossible to get work at the gold-fields. Several companies and firms have stopped working in the mines, and a large number of Europeans are idle. Salaries and wages are being cut down, and to the scarcity of work are superadded dearness of provisions and great sickness. The extent of misery and want is truly appalling.

A lesson for the free traders is found in the action of the Chinese government, which prohibits home manufactures because it wants revenue from duties.

COMMUNICATIONS upon subjects of interest to manufacturers or mechanics are cordially solicited to the columns of the TRADE REVIEW.

General Trade Topics.

THE Diamond Match Company used 1,500,000 feet of lumber in the manufacture of matches last year.

DEPRECIATION in real estate caused the closing of the doors of the First National Bank of Union City, Pa., Monday.

BUSINESS failures last week numbered 230, against 204 the week previous. The Western States reported 68.

GROSS exchanges of 22 leading cities last week were $901,195,233; New York, $649,397,619; Cleveland, $1,583,550—on the whole an encouraging exhibit.

E. M. MCGILLIN & Co., of this city, were outbid on the stock and store of Chas. Gossage & Co., Chicago, Carson, Pierie, Scott & Co., Chicago, buying it for $1,000,000.

THE extensive stove works of Myers, Osborne & Co., this city, were damaged to the extent of $50,000 to $60,000 Monday night, including the destruction of 250 tons of stove plate and valuable patterns. The works were insured in 35 companies.

O. TINTSMAN has just closed a bargain with William Thaw, of Pittsburgh, for the sale to the latter of about 1,000 acres of land desirably located on the Connellsville coke belt lying down the country from Latrobe, Pa.; consideration about $100 per acre,

ALDEN L. DELESDERNIER, representative of the New England Manufacturers and Mechanics Institute, has just returned from a visit to Florida, Alabama, Mississippi, Louisiana and Tennessee to interest the Governors and Legislatures of those States in the next fall exhibition. All the Governors promise co-operation.

WORLD'S production of pig iron, 1870, 11,745,000 tons; 1879, 14,375,000 tons; 1880, 18,313,000 tons; 1881, 19,700,000 tons. Great Britain produced in 1870, 5,995,337 tons, and in 1882, 8,450,000 tons; 1,080,000 tons of steel were produced in 1872: 3,500,000 tons in 1879; and Iron of January 5, 1883, states: "The total number of converters in the world is about 360, with an aggregate annual productive capacity, in round numbers, of 5,800,000 tons of steel."

SINCE the first week of this month the committee of the Amalgamated Association at Pittsburgh, has been preparing a scale of wages for all mills in the United States for the ensuing year from June 1. A prominent member stated Tuesday that no increase will be demanded, and that if manufacturers do not ask for a reduction there will be no strike. Several manufacturers who were seen stated that unless Congress reduces the tariff on iron more than they expect, no reduction will be asked by them.

THE general business of Cleveland is thus reported to Bradstreet's of last week: The announcement of the recent suspension in the West created some uneasiness and temporary disturbance in iron circles of this vicinity, but the feeling has already been overcome, and the conditions governing the business are about as they have existed throughout the winter. The tariff question continues a source of hindrance and uncertainty. This once settled, it is believed a better demand would be felt at once, though conservative and well-informed trade authorities say the season will be only a moderate one now under any circumstances. Prices continue low yet firm, and purchasers are buying only from hand to mouth, with an increasing effort on the part of manufacturers to reduce the cost of production wherever possible.

THE Wood-worker gives this good advice: "If you are making a good machine, get the very best cut of it you can, and have it printed on good paper, and don't, for the sake of a few dollars, condemn the tool by getting a cut which is only a daub after it comes from the printer's hands."

THE Master Mechanics' Association will hold its annual convention in Chicago June 19 next.

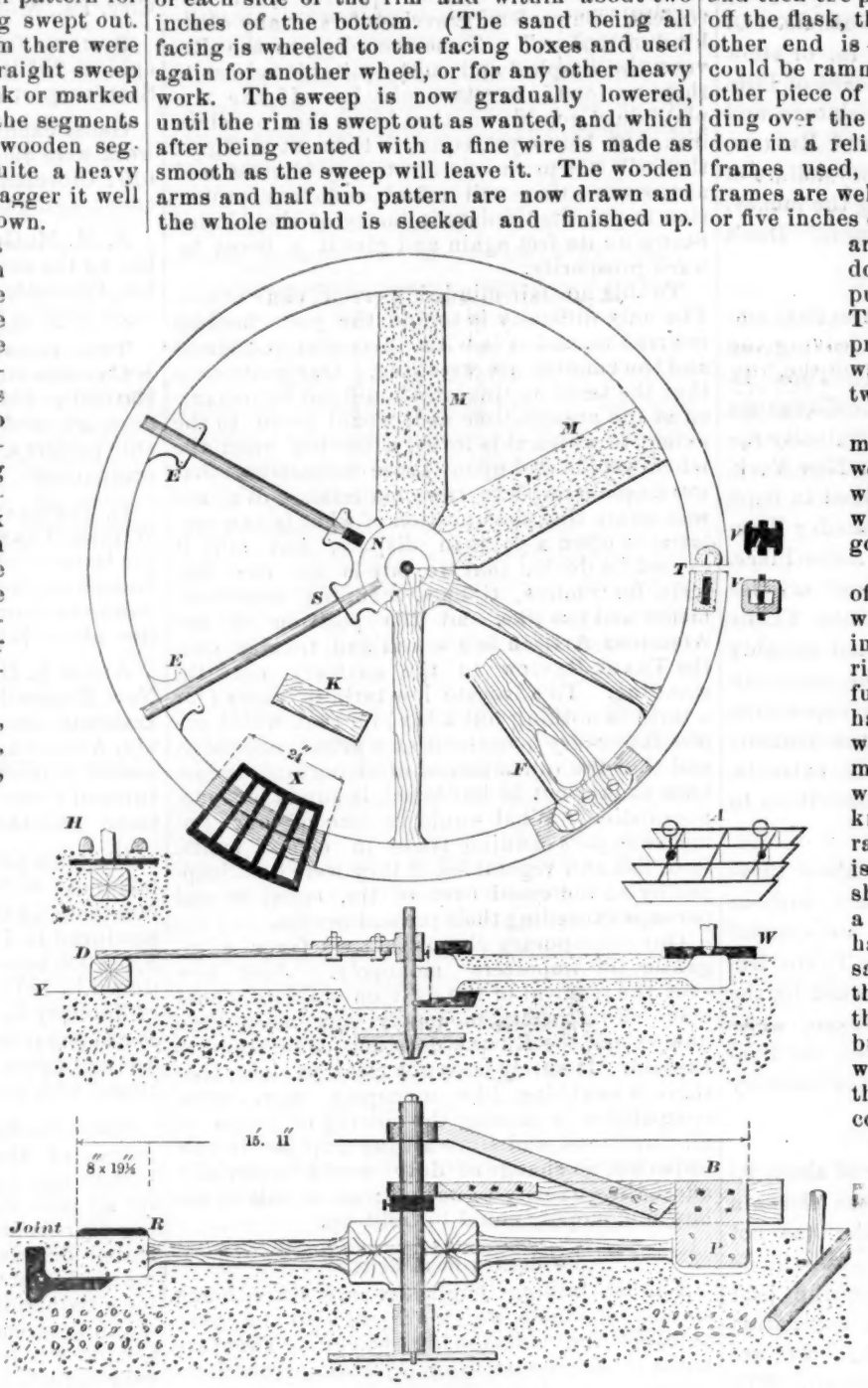
Practical Mechanics.

Moulding and Casting Fly-Wheels.

The engravings herewith shown represent different plans of sweeping and moulding fly-wheels without the having of full patterns. The lower cut is a wheel that had a full pattern for the arms and hub, the rim being swept out. For forming the cope part of the rim there were wooden segments, R, used. A straight sweep which formed the joint, also struck or marked on the joint a true circle to set the segments by. The reasons for using the wooden segments was that the wheel was quite a heavy one, and if the moulder did not gagger it well the cope would be likely to draw down.

When gaggers are set on a sand bed, or mound, they will often show their prints so as to require knocking back, which, when there is a large cope surface, or a large number of gaggers, requires considerable time and labor. Besides this it is not always a safe plan to knock back gaggers, as it will generally loosen them, thereby causing trouble, and by thus using the segments, R, this extra labor and risk was avoided. Some moulders ram up large copes without marking the mould with them, while others make their mould look as if they intended to use the hills and hollows for a guide to close the cope on by, instead of stakes or pins.

In starting to mould this wheel, a good coke or cinder bed is made, the spindle seat set, and sweep, B, attached. As this was a half wheel, the half hub and split three-arm pattern was bedded in true and level, using for a guide a piece of sweep not shown, screwed on to B. To have the hub come in the center there is a half circle cut into it so as to fit against the spindle as shown. After the half arms and hub pattern was bedded in, the outside or rim was rammed up, after what, some might think, was an odd plan. Instead of ramming the rim, or outside, up, for the purpose of forming a surface to ram up the cope on of all common sand, which has to be shoveled out when the cope is lifted off, in order to ram it up again to form the sides and bottom of the rim, the following plan was adopted: The adoption of this plan not only saved the extra work of ramming up a large hole twice, but also gave a more solid backing. This is repeated until the hole is rammed up high enough to sweep off the joints. After the joints are made and the cope rammed up and lifted off, the rim sweep is set back again, having the loose P, screwed on to B, and the rim of the wheel is then swept as follows: The sand is first shoveled out within one inch of each side of the rim and within about two inches of the bottom. (The sand being all facing is wheeled to the facing boxes and used again for another wheel, or for any other heavy work. The sweep is now gradually lowered, until the rim is swept out as wanted, and which after being vented with a fine wire is made as smooth as the sweep will leave it. The wooden arms and half hub pattern are now drawn and the whole mould is sleeked and finished up.



MOULDING FLY WHEELS

When ramming up the last segment, the moulder may ask how the pattern is got out. This is done by having a covering core to close up the last segment, or by having a cast iron flask, as shown at A, one end of which is rammed up, and then the pattern is moved back after lifting off the flask, then the flask is replaced and the other end is rammed up. The whole flask could be rammed up at once if there was another piece of segment pattern used. For rodding over the top of the rim, which must be done in a reliable manuer, there are cast iron frames used, as shown at X. After these frames are well bedded on and about 4 inches or five inches of sand rammed over them, there are some pigs bedded on to hold it down, as shown at H, the pigs being put on before the pattern is drawn. This segment pattern could be improved and made to draw out endways easier by having it cut like two wedges, as shown at K.

For the benefit of moulders that may be afraid to try this plan, I would say that I am acquainted with one foundry where nearly all wheels are made in this way, with good success.

The upper cut shows the process of moulding fly-wheels, having wrought iron arms; also for forming cast iron arm with cores, the rim being swept; another having a full pattern for the arms and hubs, having the rim swept; and fly-wheels cast one half at a time. In moulding wheels having wrought wrought iron arms, it is generally known that the rim is cast separately and first, and that the hub is cast afer the rim is cold, or has shrunk about all it can. Should a wheel having wrought iron arms have the hub and rim cast at the same time, there would not only be the difference of the shrinkage of the rim and hub to contend with, but also the expansion of the wrought iron arms, for as soon as the mould is poured the arms will commence to expand. In a short time the rim and hub will commence to contract. The rim being much larger than the hub its contraction will be several times greater, and with the expansion, or non-contraction of the arms, the inexperienced moulder will be able to see what the result would be. If he does not think of it at the time, he will find the next morning the rim cracked or broken, or the arms bent. For wheels with hubs over 12 inches in diameter the arm should be made with a taper on the ends that are cast into the hub, as shown at S. This taper can be swaged on by the blacksmith, or turned on by the machinist. For large wheels having a hub over 24 inches diameter, it is better to have the taper turned, as they will then be sure to have a true smooth taper, from which the hub when it contracts will have a better chance to pull in, or away from.

For very large hubs it is best to have key cores set in at the end of the arms, as shown at N, as they can be made to answer two purposes: the first being, that should the moulder not feel safe as regards the contraction of the hub freeing itself from the arms, the key-cores can be dug out, and the iron keys driven in to force the arms outward; this being done while the casting is hot. When the casting is cold, should the machinist find that the arms are loose, he can drive in permanent keys to hold the hub firm and stiff. This class of hubs should always be poured with iron not too hot, and the moulding of them should be done with the greatest of caution.

Before the hubs are cast, or the center core permanently set, the rim should be tested with a pair of trammels, or with a sweep attached to the spindle, to see if the wheel has contracted evenly all around. I have seen wheels drawn

The castings are poured by gates underneath the rim, as shown, and made at the Cuyahoga Works, Cleveland.

The second, or middle cut, shows another plan of sweeping up fly-wheels. The common plan of covering over large fly-wheel rims is by using segments of cores, as shown at W; or sometimes loam rings, or plates cast with prickers on them, and then filled and swept off with loam, are used. When the oven is too narrow to dry these covering rings or plates, they are cast in two half circles, so as to be admitted into the oven. The plan here shown is to cover the rim with green sand as it is being rammed up, which is done as follows: The bevel bed, Y, is first made and then the segment rim pattern, D, which is attached to an arm as shown, is set on the bed. After the cores for forming the arms and hub (as shown on the opposite side) are set; the rest of the inside of the wheel is swept up. The arm that is attached to the segment rim, shown at F, on the plan, is then taken off, the segment rim set back, and the outside and top of the rim is rammed up, and the segment pattern having a slight draft to it, is, when ready, drawn out around end-ways. The moulder can now look into the rim mould, to see that everything is all right. After this replace the pattern or segment, inserting one end into the end of the mould 2 or 3 inches, and ram up and finish another segment. Repeat this operation until the whole rim is rammed up.

out of true so much, that in setting the center core in the hub, it had to be set over ½ an inch out of the center, in order that the hole could be bored true with the rim.

When this class of wheels are moulded without having a full pattern to work with, the rim can be swept out, or formed with a segment, and the projections, E E, can be formed in cores; but for moulding the hub it is better to have a full pattern to work with.

At M M, is shown a plan for making cores to form cast iron arms. The wooden arms shown are for the purpose of making or moulding wheels that are covered entirely with a cope, having the rim swept out as described and illustrated by the lower cut.

Very often large wheels are cast in halves, having chipping or planing pieces cast on, so as allow them to be fitted together. Without experience in making such wheels, it is often found that when it comes to putting them together they will meet at the hub leaving the rim open as shown at T. Clipping off the hub to bring the rim together will often make the wheel out of round, to avoid which the rim should be moulded so as to project from half to three quarters of an inch beyond the center of the face of the hub.

V V shows the general plan of coring and casting half fly-wheels. Sometimes for heavy wheels there are lugs cast on the inside of the rim so that bolts can be made or placed in connection with keyed or shrunk irons.

In moulding fly-wheels there is not always the attention given that should be, in regard to having the faces true and the rim an exact circle. A good moulder will take as much pride in trying to make a wheel that will run true and even as he will to have a smooth, solid casting. — [From the *American Machinist* (April 15, 1882) with additions for the TRADE REVIEW, by the author of "AMERICAN FOUNDRY PRACTICE," published by John Wiley & Sons, 15 Astor Place, N. Y.

Coal and Ore.

COAL drilling is in progress on the farm of Wm. Wise, Tallmadge, Summit County, with good prospects.

A lump of coal weighing three tons was recently taken out of the Front mine.—Youngstown News-Register.

IT is said that the Excelsior Coal Co., of Akron, have run their new mine near Doylestown more steadily and shipped more coal during the past year that any other campany in that part of the Tuscarawas Valley.

THE new slope mine of the Dennison Coal Co., located about a mile from Dennison, O., is now running, averaging about two-thirds time. All the engines on the N. Y. P. & O. road coal at Dennison, giving the miners work often when other orders are scarce. A branch is also run from the main stem of the road to the mine to enable them to load coal for shipment.

AN Akron letter to the Pittsburgh Telegraph says: The Brewster Coal Company are operating their Burnett mine, near Doylestown, under the supervision of Mr. C. L. Huber, more steadily the past few weeks, employing about 100 men. The Humphrey slope is also running with from 25 to 30 men in. Middlebury shaft has lost some time on account of the washouts on the Valley road. They now run double shafts and expect to finish it this spring.

SAYS a Corning, O., letter to the Pittsburgh Telegraph: There is very little change to report in ming affairs in this neighborhood. Last week mine No. 19, at Buckingham, ran three and a half days, loading from 26 to 28 cars per day. There are 70 miners employed there, mostly German. At Hamburg, in mine No. 12, the men got three days, averaging an output of 24 cars per day. English, German and colored miners are employed to the number of about 200. There is not much doing at mine No. 11, with the exception of what coal is required for locomotive purposes. Mine No. 13 has not done anything since the 8th of this month, but rumor says it will start up again in a few days.

The TRADE REVIEW $3 per year.

Useful Inventions.

Post's New Compound Hydraulic Elevators.

The two annexed engravings represent a new style of a compound hydraulic passenger elevator, and a hydraulic elevator engine, as used in hotels, warehouses, manufactories, etc. This elevator was designed by Edward C. Post, to fill a want long felt, combining the greatest safety with the most economical consumption of water, without complicating its machinery, and rendering all parts thereof readily accessible, it being in fact *two* machines operating one elevator car.

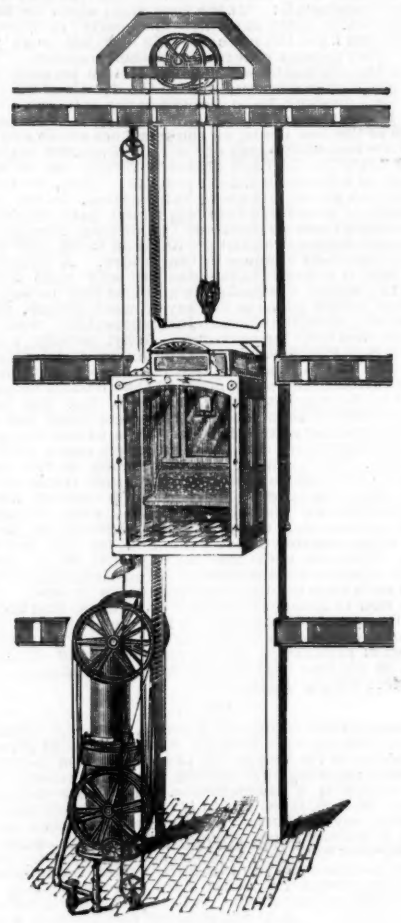


FIG. 1.

Fig. 1 is a partial perspective view of a four cable passenger elevator, showing the manner in which it is set up.

Fig. 2 gives a perfect representation of a two cable hydraulic engine, as used for freight elevators.

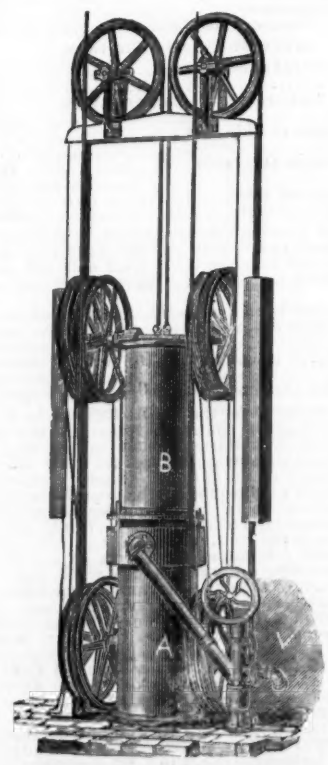


FIG. 2.

By referring to Fig. 2, the construction of the machine can be clearly understood. A is a heavy cast iron cylinder, bolted to a heavy head plate, set on a brick foundation; on this bed plate rest the engine uprights, which are made of channel iron acting as guides, for the rollers on the sheave shafts, and are connected on the top with each other by a strong arched plate. To the top of the cylinder is bolted the stuffing box, which, being filled with special hydraulic packing, makes a water-tight joint for the piston, B, to pass through. On the top of the piston rests the shaft carrying the upper cable sheaves, which, by being raised or lowered, perform the wosk of the elevator. In order, however, to counteract the weight of the piston, sheaves, and elevator car, this shaft is counterbalanced by two heavy weights, suspended over two sheaves on the top of the arched plate. The operation is as follows: By turning the wheel of the double piston, three way balanced valve, V, to the right, the water is admitted from the water supply through a pipe into the stuffing box, and from thence into the cylinder, forcing the piston through the packing in an upward direction, causing the upper sheaves to travel away from the lower ones, thereby expanding the hoisting cables, and elevating the car on their other ends. And, if the wheel of the balanced valve, V, is turned to the left, the water from the cylinder is permitted to flow through the lower part of the valve into the drain, allowing the piston to drop into the cylinder; the consequence being, that the car on the other end of the cable descends.

The platforms are all made of the best seasoned oak or ash, and, although being perfectly safe, having two or more cables to carry the car, are provided with the A. B. Ellithorpe patent air brake and safety stop, the strongest and most effective safety device known, which is not in any way connected with the hoisting cables, but is an independent attachment, governed by the speed the car may obtain in a downward direction, from any cause whatever. In case the cable should break, the car will not be stopped by a sudden shock, but by means of the compressed air, which causes the brake to be applied, it will be arrested within about six feet of where the cable was broken.

For passenger elevators, which are constructed with four, six, or eight hoisting cables, the Ellithorpe patent air cushion may also be applied in addition to the air brake. By means of the counterbalances, which relieve the engine of the weights of the car, piston, sheaves, etc., these elevators are enabled to perform more work, with a given quantity of water, than any other machine in the market, utilizing about 95 per cent. of the power expended.

They are manufactured only by the inventor, Edward C. Post, Toledo, O., of whom further information may be obtained.

Center of Population.

THE center of population of the United States, according to the census of 1880, is in Kentucky, one mile from the south bank of the Ohio River and eight miles west by south from the heart of Cincinnati. The center of population of Ohio, as just figured out, is at the crossing of the Cleveland, Akron & Columbus and Ohio Central railroads, near Centerburgh, Knox County. In this connection the suggestion of Health Officer Ashmun, of this city, is not a bad one. He would, if he were a Vanderbilt, "devote a million dollars or more to the construction of a great monument, to be erected at the close of this century at a central spot in the United States and properly inscribed, showing the history of the country and important achievements." Of course it will never be done, but it is a good idea. all the same.

STILL further progress has been made on the Senate tariff bill during the past week. The House—129 to 22, most of the Democrats refusing to vote—adopted the Reed rule for the reception of the Senate bill and by a vote of 148 yeas to 110 nays sent it to a conference committee composed of Messrs. Morrill, Sherman, Aldrich, Beck and Bayard on the part of the Senate and Kelley, Haskell, McKinley, Randall aud Carlisle on the part of the House. The prospects of an agreement are not considered overly good.

THE miners of Mineral Ridge have accepted the 10 cents reduction, following the Tuscarawas Valley miners.

Railroads and Telegraphs.

ALL contracts on the Pittsburgh, Cleveland & Toledo Railroad call for their completion by July 1.

DURING January 26 cars were substantially rebuilt at the Akron shops of the C., A. & C. Railroad.

THE Con notton Valley Railroad last week, four mogul engines from the Brooks Locomotive Works at Dunkirk, N. Y. They are named Emir, Al Korard, Mohammed and Howadji. —The Canton Wrought Iron Bridge Co. shipped to the Connotton yesterday, two iron bridges to take the place of the wooden trestle that span the Nimmishiling, north and south of this city.—The Canton Car Company are delivering four gondola cars a day to the Connotton Railroad Company.—[Canton correspondence Akron Beacon.

THE Railway Age publishes a summary of the railway construction in the United States for the year 1882. The account covers only the main track, shows the construction in forty-five of the forty-seven States and Territores on 342 lines aggregrate 11,343 miles, or about 2,000 miles more than in 1881, which exceeded any previous year by 2,000 miles. The construction is divided as follows: Five New England States, 53½ miles; four Middle States, 1,315½ miles; five Middle Western States, 2,077½ miles; eleven Southern States, 1,490½ miles; four in the Missouri River belt, 2,063½ miles; five in the Kansas belt, 2,157¼ miles; five in the Colorado belt, 1,165 miles; six in the Pacific belt, 1,020 miles.

THE Pittsburgh papers learn that Pittsburgh is in a fair way to have an other line to Cleveland and the West, independent of either the Pennsylvania or Lake Erie system. The New York, Pennsylvania & Ohio Road has a line running through Middlesex, Mercer Country. From this town to New Castle, Lawrence County, it is only 15 miles by way of the Shenango River Valley. Reaching Pittsburgh, a connection will be made with a marginal road which is to be constructed by a number of New Castle capitalists and manufacturers, who already have a charter for its construction. Another short road is perfected from New Castle to Chewton, nine miles south. At Chewton this road will connect with the New York, Pittsburgh & Chicago road. The idea is to give the New York, Cincinnati & Ohio road a connection with the New York, Pittsburgh & Chicago road. The Buffalo, Pittsburgh & Western road, now the New York, Buffalo & Philadelphia road, have a line to New Castle, and want to connect with Pittsburgh, which can be accomplished by the Chewton road, and a connection with the New York, Buffalo & Philadelphia at Wampum, at the Beaver river. Then by the use of the Pittsburgh & Western road, Pittsburgh will have a short and quick line to Cleveland and the West.

Protection from Emery Wheels.

The inconvenience and danger arising from the use of emery wheels—such as the inhaling of the dust, as well as the particles of metal cut from the pieces being operated upon, and not less the injury to the eyes frem the presence of the foreign substances—have led to the adoption of some ingenious protective devices devices. In Germany, masks are made of mica, that entirely cover the face, and from which an air tube carried around between the shoulders, where it is provided with a mouthpiece filled with saturated sponge, through which the air supply is drawn; the mica is of course transparent, and is not easily broken.

Paper Furniture.

It is stated that paper made from strong fibres, such as linen, can now be pressed into a substance so hard that it cannot be scratched by anything but a diamond. In view of this fact, it is thought that before long a great variety of house furniture will be made of paper instead of wood.

NICKEL is proposed in France as a substitute for bronze in coinage. To prevent the coins from being mistaken for silver the pieces will be octagonal instead of round.

The Markets.

OFFICE OF TRADE REVIEW AND WESTERN MACHINIST.
CLEVELAND, FRIDAY EVENING, March 2, 1883.

IRON ORE.

The adjournment, without action, of the Republic Iron Co., which is generally looked to to take the lead in fixing prices of iron ore, correctly reflected the state of the market—everything is still unsettled and no predictions can be made as to the probable course of the market. All the ore now sold is in small quantities and on private terms. Nothing definite can be obtained in any of the mining offices for the simple reason that nothing definite is known. No contracts are looked for before the opening of navigation. Stocks on the docks still remain undisposed of. We continue to quote:

No. 1 Specular and magnetic Bessemer Ores per ton	$8.50@$9.00
No. 1 Specular (non-Bessemer) ores per ton	8.25@ 9.00
Bessemer Hematite	6.00@ 6.50
Non-Bessemer Hematite	5.50@ 6.00

Discussing the ore situation, the Pittsburgh Telegraph of Wednesday has this to say of decided local interest (from the Pittburgh standpoint): "It is a long time since the men who control the ore industry have not met early in January at Cleveland and fixed the price to rule for the next twelve-months. This present year furnishes the exception. The directors in the ore combination or association seemed, according to a gentleman conversant with the details of the [Republic Iron Co.] meeting, to be divided in the opinion as to fixing the new price at $8 or $9 per ton. Owing to the depressed condition of the iron trade, all the small ore mines and practically all the hematite mines of the Lake Superior regions are now shut down for the year, so that no output can be expected from them as a factor in the ore product. This, according to the gentleman giving the above information, leaves 15 or 20 large Standard mines still running, which have capital sufficient to enable them to continue producing throughout the whole season without realizing a profit on sales, and who are willing to take their chances in the future. A former Pittsburgher who is engaged in the iron ore and steel brokerage business in Chicago was spoken to and had this to say: 'If this state of affairs keeps on for, say a week longer, the furnace men will have the ore men just where they want them, and for the first time for years too. Why, nobody wants ore at old prices. The docks at Ashtabula and at Cleveland are loaded down with ore, a thing that hasn't been seen for years. So far as furnace men are concerned the question of prices of ore turns on the market for pig, which is and has been for some months lower than when ore contracts were last made.' The general verdict of the manufacturers of this city is that a dollar reduction in ore is rubbing off only a small part of the jagged edge. The ore men, it is held, such is the force of habit, will be certain to demand 'all that the traffic will bear' —that is, they will expect a share of the profits of manufacture beyond the raw material condition, even though they bring the entire system of industries concerned to the verge of prices which would cut down demand for the house productions. Furnace men and rolling mill firms, however, think they observe a disposition to acknowledge that the prospects are such as to require fair concessions in ore. The ore contracts now in force extend until June 1st, so that there is no especial hurry as to fixing the rate for the following twelve-months, except that this would enable furnace men to figure on the cost of production thereafter and admit of close calculation, by pig iron buyers, as to when the difference of rate should affect the pig quotations."

IRON.

"The same as last week only more so," was the laconic description of the pig and foundry iron market as given by a leading dealer to the TRADE REVIEW. Pig iron is dull and lifeless, and "blowing out" is still the talk among furnace men. Foundry is a little better, with some encouraging symptons. Messrs. H. S. Mould & Co., in their circular issued Wednesday, say: "The market for the past week has been quiet but is without doubt gradually getting a better tone. The foundry trade is quite fair and stocks of foundry iron are light both in consumers' and furnace hands. Should consumers enter the market for usual sized purchases, they would find very little good iron to be had. First-class softeners are especially scarce." It is the general feeling that when the tariff agitation is over, whether the bill passes or not, prices will stiffen considerably. The early adjournment of Congress and the fact that no extra session will be called will, it is believed, hasten the day of improvement. Light stocks are the rule among small dealers, and the legitimate business of the country must sooner or later stimulate demand. American Scotch or good soft irons are particularly scarce, and command relatively more price than strong irons. We quote:

CHARCOAL PIG IRON.

No. 1 Lake Superior charcoal	$25.00@27.00
No. 2 Lake Superior charcoal	25.00@27.00
Nos. 3 and 4 Lake Superior	26.00@28.00
Nos. 5 and 6 Lake Superior	25.00@28.00
Nos. 1, 2, 3, 4, 5, Salisbury	37.00@40.00
Nos. 1, 2, 3, 4, 5, Tennessee, cold blast	28.00@31.00

BITUMINOUS AND COKE IRON.

No. 1 foundry, all lake ores	$22.50@23.50
No. 2 same	22.50@23.00
No. 1 foundry, lake ores, with cinder mixture	22.00@23.00
No. 2 same	21.50@22.00
No. 1 foundry, native Ohio ores	22.00@ 24.00
No. 2 same	21.00@ 22.00
No. 1 silvery, native Ohio ores	21.00@ 22.50
No. 2 same	20.00@ 21.50
No. 1 gray forge, red short	22.50@ 23.00
No 1 gray forge, neutral	20.00@ 21.00

Merchant iron and steel are unchanged, with light demand. Steel rails are held at $44, with rolling mills running double turn at present. Old iron rails bring $25 and old steel rails shading $20. Muck bar is weak at $36@$37. Scrap continues dull.

While the market is, in a measure, demoralized, and several heavy failures have followed in rapid succession, it would be a mistake to conclude that business is on an unsound basis. The best authorities consider that the present stagnation is largely artificial and temporary. That these conditions are not characteristic of the iron trade is generally appreciated.

CINCINNATI (reported for the TRADE REVIEW by E. L. Harper & Co.)—The market continues lethargic; the sentiment prevailing that the present condition of things may remain unchanged through the spring, is a morbid view that we do not think warranted by the outlook. Sharp competition has reduced margins of profits obliging the manufacturer to exercise wisdom and caution in his purchases of material and necessarily augments the feelings of uncertainty and insecurity which protracts the continuance of the inactivity. The flood proved more calamitous than was expected, and the losses are far above the estimates made a week ago. It will be some weeks before the damages can be repaired, and the submerged industries put in satisfactory condition. There is no perceptible change in prices. We quote the current figures for best brands in usual orders (4 mos): Foundry—Hanging Rock Charcoal, No. 1, $24 50@$2. 50; Hanging Rock Charcoal, No. 2, $23 50@$24 50; Strong Neutral Coke, No. 1, $21 00@$22 00; Strong Neutral Coke, No. 2, $20 50@$21 50; American Scotch Coke, No. 1, $20 50@$21 00. Grey Forge—Neutral Coke, $20 00@$20 50; Cold Short, $19 00@$19 50. Car Wheel and Malleable—Hanging Rock Cold Blast, $32 00@$33 00; Hanging Rock Warm Blast, $27 00@$28 00; Lake Superior, 1 & 2, $26 00@$27 00; Lake Superior, 3 to 6, $27 00@$28 00; Southern Car Wheel, $31 00@$33 00.

OTHER METALS.

The general metal market possesses no noteworthy features this week. Lake copper is quoted at 18c, Arizona at 17¼c, and Baltimore at 16½c. In tin, the leading quotations are Straits 22c, Beanca 22¼c. Lead is quoted at 4¾c; Spelter at 5c, and Antimony at 11½@12c. An Eastern contemporary says: "The possibility of a more liberal export of black copper from Arizona and New Mexico, by way of New Orleans and Galveston, to English markets, is beginning seriously to engage attention, and there are those who predict that a pool of producers of Western copper will be attempted with a view to follow the tactics so long and so successfully followed by the Lake companies."

LUMBER.

The spring demand has hardly yet set in, but with the continuance of pleasant weather business will no doubt open up briskly. The Northwestern Lumberman says: "The virtual settlement of the lumber-tariff question by the refusal of the house of representatives to put lumber on the free list, has inspired manufacturers with more confidence than they felt when the mattef was in doubt. They now feel that they have a basis for making a fight to maintain values, which no doubt has entered to their more recent determination to preserve a firm attitude."

WOOL.

A good demand and a large volume of business have characterized the Eastern markets the past week. Sales in Boston for the week aggregated 4,321,500 pounds, to 4,438,500 the week previous. Ohio X and XX are quoted at 44@45c; X at 43c; No. 1 at 44½@47c. In the local market we quote: Coarse clothing and combing 25@26c; medium 35@38c; fine 34@35c.

CLEVELAND LUMBER MARKET.

PLANK—2 INCH—MIXED WIDTHS—A 1&2, $50; A 3, $40, B $32, C $20, D $14, E $12. 1¼ and 1½ inch—A 1&2, $48, A 3, $40, B $32, C $20. D $15, E $13.

BOARDS—1 INCH—MIXED WIDTHS—A 1&2, $44, A $36, B $30, C $19, D $14, E $12.

STOCK BOARDS—12 INCHES WIDE—A 1&2, $45, A 3, $34, B $32, C $21, D $16.

STRIPS—6 INCHES—A 1&2, $42, B $32, C $22, D $16, E $12.

WORKED LUMBER—FLOORING—A 3, $42, B $35, C $24, D $18.
Norway Flooring. A 3, $28, B $22, C $18.
Matched Drop Siding 6 in. A 3, $42, B $36, C $24, D $20.
Beaded Ceiling $2 higher than flooring.
One-half inch bevel siding. A 1&2, $24, A 3, $20, B $18.
Ash flooring. A 1&2, $38.

BILLSTUFF—Small, 16 feet and under, $14; 20 feet and over, $4@6 less than length.

SHINGLES, LATH, AND MILL WORK.

Shingles XXX 18 inch	$4 25
Shingles, clear butts	3 00@3 25
Lath	2 75@3 00

Surfacing one side, $1.00; 2 sides, $1.50.
Making, flooring and drop sidings, $2.25.

Reviews.

THE new Sunday edition of the Cleveland Herald is bright, spicy and in every way creditable.

WE welcome to our exchange table the Water Gas Journal, Girard Building, Philadelphia. It is not "gassy" but full of its motto—"Light, Heat, Power."

THE plan and scope of the Agents' Herald, Philadelphia, are unique and the paper is bold in its denunciation of frauds of all kinds. It is an excellent paper to have.

PART II of what "Eighty-three Business Men" have to say about "Our Business Boys" appears in the March Wide-Awake and will be eagerly read. Every business man should see that it gets into the hands of his own boys and younger employes. The other articles are both entertaining and instructive—"wide-awake" in every sense of the word.

THE leading article in the March Art Amateur is a capital notice of the Water-Color Exhibition, by Edward Strahan, with illustrations of over 30 of the noteworthy pictures. Boughton's beautiful painting, "Snow in Spring," is finely reproduced, and there is a good portrait of Dore, with some well-chosen examples of his work. The other departments are most pleasing, as usual. Montague Marks, Publisher, 23 Union Square, New York.

MANY newspapers and magazines have been established in the United States and Canada within the last two years, the names of which do not appear in any newspaper directory or catalogue. The publishers and editors of such are invited to send copies and a full description of their respective publications to the Editor of Hubbard's Newspaper and Bank Directory of the World, New Haven, Conn., that they may be properly catalogued and described in the forthcoming edition of that work for 1883.

WE have lately received four elegant steel engravings, published by Messrs. Stinson & Co. All are very fine works of high art, and do credit to the publishers. These engravings are very large, thirty by forty inches each; the original paintings, and the steel plates, cost some $33,000. The engravings are sold at $15.-00 per copy. These engravings are entitled "Sing, Birdie, Sing," "Remembrance," "The Bather's Attendant," and "The Garden Gate." They are in all respects fully up to the representations of the publishers, Stinson & Co., Portland, Me.

Cleveland Wholesale Prices.

[The lowest quotable prices are given in all cases.]

HARDWARE.

Adzes.

Carpenter's.....per doz $18 40
Ship..... " " 18 75
Heavy railroad.. " " 19 50

Axes.

per doz.
James' 2d qual..... $7 00
Buckeye..... 8 00
" doub. bitt..... 15 00
Hunt's..... 9 50
Mami's..... 8 00
Lippincott's Crown..... 8 50
Cut More..... 9 00
Peck's Double Bit..... 22 00
"Champion Blade..... 11 00
Good triple silver steel.. 11 50

Anvils.

per lb.
Eagle, Amer.....10c dis 20
Wright's.....10¾c@11c
Armitage's Mouse Hole.....9¼c@9¾c
Trento.....10¾c
Wilkinson's.....10¾c

Anvil Vise and Drill.

Millers Falls Co. $28.....dis 20
Cheney Anvil and Vise dis25&2

Vises.

Solid Box, list of July 1, '79.....dis 40
Solid "Crown" (A. H. Hildick).....40 to 100 lb. 15c net
Solid, Peter Wright's.....15½
Solid, Wilkinson's.....13½
Parallel, Parker's.....dis 40
" Simpson.....dis 20
" Prentiss.....dis 15
Saw Filers, Hopkins' ℔ doz $17.50, dis 10
" Wentworth's... 9 00
Reading.....dis 45&10
Cowell Hand Vises.....dis 20
Richardson's Vise and Anvil.....dis 25

Augurs and Bits.

C S cut augers.....dis 45&10
do do do bits.....45&10
D C gimlet do Ives.. dis 50
Snells bits.....dis 40&10
Russell Jennings' augers, dis 10&10&10
Cook's pat augur.....40&10

Animal Pokes.

Akron.....$ 3 50
Camp's..... 4 00
Berea, per doz..... 4 00
Eagle, per doz..... 5 00

Apple Parers.

Domestic&Reading ℔ doz.$7 50
Turn Table..... 5 00

Bolts.

Machine..... dis 70
Plow..... dis 50
Plow, R. B. & W dis 40
Cast Iron Barrel Shutter, etc.....dis 55&10
Cast Iron Chain (Sargent' list).....dis 60&10
Ives' Pat. Door Bolts. dis 50
Wrought Barrel.....dis 55&10
Wrought Square.....dis 55&10
Wr'g't Shut'r, all iron, Stanley's list.....dis 50&10
Tire, R. B. & W., new list.....dis 70&10
Stove, American Screw Co.'s.....dis 40
B. B. & W.....dis 40
Bolt Ends 16c. per lb net... 60

Bellows. Dis

Bl'ksmith's com new list,45℔ct
Moulder's new list, dis 25 ℔ ct
Hand, new list, 25 per cent

Butts. Dis

Wrought brass..... 65&10
Cast, loose joint.... 55&10
Pin, loose..... 50&10
Wrought, fast joint narrow..... 45&10
Wrought fast joint broad..... 45&10
Wrought loose joint broad..... 55&10
Wrought table and back flaps..... 45&10
Loose joint, without acorns..... 55&10
Ten per ct. extra dis for cash.

Cleveland Stamped Elbows

Genuine Russia Iron

4½inch, per doz..... 5 50
5 do do..... 7 50
6 do do..... 9 50
7 do do.....11 00

Planished Amer. Russia Iron

7½inch per doz..... 5 00
4 do do..... 6 50
5 do do..... 9 50
6 do do..... 8 50

Charcoal Iron

4½inch, per doz..... 2 50
5 do do..... 3 50
6 do do..... 4 25
7 do do..... 5 50

Discount 33⅓ per cent

Chisels.

Hot and cold cutting...℔ lb 30
Railroad track..... 30
Machinists..... 30
Mallet head..... 50
Jape..... 50
Packing..... 50
Stone cutters..... 50

Crowbars.

Cast steel.....℔ lb 7½
Iron, steel points..... 5c

Cutlery, Pocket and Table.

Meriden Cutlery Co., table net
Am. Miller Bros,' Cutlery Co.....dis 25
Humason & Beckley, pocket 33⅓
Naugatuck Cutlery Co. list net
Aaron Berkenshaw's pocket dis 25
Fram Cutlery Co., .. table net
Cleveland Cutlery Co....dis 25
Miller Bros., pocket.... 33⅓

Coopers' Tools,

Bradley's..... dis15@20
Braton's..... dis15@20

Chains.

Coil by cask,.....

3-16	¼	5-16	⅜	7-16	½
10¾	9	8	7	6¾	6¾

Drills and Drill Stocks.

Blacksmiths', each $2.50 dis 10
Blacksmiths', self-feeding, each 7.50 dis 20
Breast, P. S. & W ...dis 20&10

Drawing Knives.

Peck, Stow & Wilcox... dis 70
Witherby's.....dis 65@10
Nobles Mfgr. Co..... 15
Adjustable handle..... 20

Emery and Emery Paper.

Regular Numbers.....℔ lb 6c
Flour and F. F.....℔ lb 4c
B. & A. Emery Paper dis 30&5

Enameled & Tinned Ware.

Kettles.....dis 50
Sauce Pans.....dis 30
Tinned Sauce Pans..... dis 30

Files.

Parkin's $5 to £.. dis 50 ℔ cent
Auburn $5 to £.. dis 35 pr cent
E.M. Boynton's, new list dis 25
J. & Riley Carr .....4.50 to £.
Johnson & Bro.....dis 30
Butcher's.....4.50 to £.
Walter Spencer & Co.'s "Diamond".....4.50 to £.
Fisher's.....4.75 to £.
Moss & Gamble.....4.50 to £
H. Disston & Sons (new list).....dis 50 per cent
Heller Bros.' Horse Rasps dis 35
Nicholson.....dis 40&10
New American.....dis 40
Union File Co.....dis 40

Grindstones.

Berea.....1@1½℔ lb
Ohio.....1¼@1¾℔ lb
Nova Scotia.....1¼@1¾℔ lb
Lake Huron.....1@1½℔ lb

Hammers.

Maydole's.....dis 15
Cheney's.....dis 25
Hartford Hammer Co....dis 20
Humason & Beckley.....dis 50
Verree.....dis 5
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50 and $1.75,dis25&10
Nelson Tool Works..dis 40&10
Warner & Noble's.....dis 5
Kip's.....dis 15
Yerkes & Plumb.....dis 15
Wilkinson'sSmiths1½c℔ lbnet

Hatchets.

Yerkes & Plumb:--Shingling, Nos. 1, 2, 3, ℔ doz $7 50,$8 00,$8 50, dis 25
Claw, Nos. 1, 2, 3, ℔ doz$8 25,$8 75,$9 25, dis 33⅓
Lathing, Nos. 1, 2, 3, ℔doz $7 50,$8 00,$8 50, dis 33⅓
Buckeye.....dis 33⅓

Nails.

10 to 60d.....$3 40
8 and 9d..... 25
6 and 7d..... 50
4 and 5d..... 75
3d..... 1 50
2d..... 2 75
3d fine..... 3 00
2d fine..... 3 75
⅞ inch..... 3 00
4d barrel..... 1 00
1¼ inch barrel nails..... 1 50
1¼ do do do..... 1 75
1 do do do..... 2 50
¾ do do do..... 3 00
Cut spikes, all sizes..... 35
Clinch nails, all sizes..... 1 75
Casing and box nails..... 75
Finishing nails,.....$1 25
Tobacco nails,..... 50

Nuts and Washers

Nuts, square.....7½c off list.
Nuts, hexagon.....8c. off list.
Washers.....7c off list.

Picks.

Railroad, 4 to 5 lbs.. doz $6 60
5 to 6 lbs.. 7 20
to 7 lbs.. 7 80
7 to 8 lbs.. 8 40
Railroad Tamping Pick.. 7 to 8 lbs..doz 10 80
Mill Picks per lb..... 75c

Rivets.

Iron.....dis 40
Tinned.....dis 40
Copper.....dis 50

Squares. Dis

Steel or iron, case lots..... 50
Try squares and T bevels..... 40

Spikes—WROUGHT

All lengths by ¼ inch.....4½c
do do do 5-16.....3½
do do do ⅜, 7-16 & ½in 3¼

Shovels and Spades.

Ames' new list, July 1, 1881,.....dis 15
Old Colony.....dis 15
Remington's (Lowman's Patent).....dis 30
Bishop.....dis 50
Chisholm.....dis 25@30
Rowland's.....dis 40 and 10
Griffiths.....dis 40&10

Sad Irons.

From 4 to 10 lbs. per lb 3½ net
Self-Heating.....℔ doz $9 net
" Tailors.....℔ doz $18 net
Gleason's Shield and Toilet.....dis 25
Mrs. Pott's Irons, double pointed.....dis 35
Mrs. Pott'sIrons, square back.....dis 35
Enterprise Star Irons...dis 35
Combined Fluter and Sad Iron.....℔ doz $15, dis 15

Bag Holders.

Sprengle's Pat, $18.00 per doz 40 per cent. dis.

Saw Sets.

Boynton s patent X Cut, per doz $12; Hand Saw, per doz $10.....dis 20
Stillman's Genuine, per doz $3 50 and $5 50.....dis 10
Stillman's Imitation, per doz $3 25.....dis 20&10
Common Lever, per doz $3 dis 30&10
Leach's No. 0 $8; No. 1 $15; dis 15
Hammer, Hotchkiss$5 50, dis 10
" Bemis & Call Co.'s new patent.....dis 40&5
Bemis & Call Co.'s Lever and Spring Hammer dis 30&5
Bemis & Call Co.'s Plate.dis 10
" " Cross-cut dis 12½
Aiken's Genuine $13, dis 50&10
" Imitation...$7, dis 50
Hart's Patent Lever.....dis 20
Disston's Circular.....dis 40

Scales.

Hatch, Counter, No. 171... ℔ doz. $42, dis 37½&10
Union Platform.....$6, dis 45
Fairbanks'.....dis 20
Buffalo Scale Co.....dis 40
Forsyth Scale Co.....dis 25.
Howe's.....dis 20&10
Chatillon's Eureka.....dis 25
Family U s versal.....dis 50
Scale Beams.....dis 33⅓&10

Planes.

Ohio Tool Co.....dis 20
Sciota.....dis 25
Bailey's Pat. Adjustbledis 20@10
Sandusky, fancy.....dis 15
Buckeye.....dis 20
Ogontz.....dis 25

Rules.

Stanley.....dis. 70 &10

Sash Locks. Discount.

Payson Mnfg. Co. "Perfect"42
Simmons' Sash Supporters. 20
Morris..... 40

Hinges.

Champion double acting spring hinges.....dis. 30
Screw & Strap 8@12in. ..$5. net
Gravity Locking Blind Hinges, Sargeant & Co. 70&10
Clark & Co.....70&10

Screws. Dis

Flat head iron or steel [new list] per cent dis.50&10
Flat head brass.....50&10
Round head iron or steel45&10
Round head brass.....40&10
Brass and Silver capped. 30
Japanned, list of Plain Screws..... 40
Coach, patent Gimlet point, list per 100..... 65
Lag, taper points..... 65
Bed..... 10
Machine, flat head, iron. 55
round head, iron 50
Bench, iron.....55&10
wood, beech, per doz $3..... 10
wood, hickory.... 20&10

Valves. Dis.

Jenkins' Patent Gate Valves.35
" " Globe " .40
" Standard Packing " .20

Wrenches.

Coe's genuine..... 50
Girard Standard....dis 50 & 10
Mechanics' 10 and 10....dis. 50

Wire.

Brass and Copper.....dis 25
Bright & annealed, Nos. 0 @ 18 dis 50@55
" " Nos. 19 @ 26 dis 60
" Nos. 27 @ 36 dis 65
Coppered Nos.0@18, dis 45@50
Galvanized, Nos. 0@18,market list,.....dis 40@42½
Tinned, Nos. 0 @ 18,dis 45@47½
Cast steel.....dis 40
Tinned Broom Wire, Nos. 18 @ 25.....dis 55
Annealed Fence, Nos. 8 and 9.....dis 55@60
Annealed Grape, Nos. 10 to 14.....dis 55@60
Galvanized Telegraph, Nos. 7 to 9.....℔ lb 6c
Galvanized Telegraph, Nos. 10 to 11.....℔ lb 8¼c
Galvanized Telegraph, No. 12.....℔ lb 10½c
Fence staples.....℔ lb 5½@5¾c
Fence Staples, galvanized, ℔ lb 7@7¼c
Stubs Steel Wire $6 00 to dis 30
Barb Wire, painted..... 8c
Barb Wire, galvanized... 9c
Crucible Steel Ropes from ¾ in. at 9c to 1¼ in. at.....52c
Best Selected Iron Ropes from 3-16 in. at 3c. to 1¼ in. at.....33c

Boiler Plates.

"Gaylord"-Standard Quality.
C. No. 1.....1 50
C. H. No. 1 Shell.....4 75
C. H. No. 1, 50,000.....5 25
C. H. No. 1, 55,000.....5 75
C. H. No. 1 Flange.....6 50
Firebox.....
T. S., 60,000.....(as per)..6 50
T. S., 65,000.....(act of)..
Homo. Steel, 70,000(of Cong)7 50
Heads, ¼c ℔ lb. extra.
N.B.-Eastern brands of boiler plate at from 2-10 to 3-10c ℔ lb less than above prices.

Nuts, Bolts, etc.

Square & Hex. Nuts..8 off list
Washers.....7c. off list
Machine Bolts.....dis 70
Bolt Ends.....dis 70
Boiler Patch Bolts.....net list

Boiler Tubes.

"National" Standard Gauge 1 inch to 10 inch.....dis 37½
"National" Standard Gauge 11 inch to 15 inch.....dis 25
"National" Special Locomotive Tubes.....net list

Sheet and Tank Rivets.

"Norway."

All sizes.....dis. 15

Boiler Rivets—"Albany."

⅜,½,11-16,and ¾ in. diam.5 50

Cutlery.

Meriden Cutlery Co., (Table).....
Am. Miller Bro's Cutlery Company.....dis. 25
Humason & Beckley, Pocket.....dis. 33⅓
Naugatuck Cut. Co....list net
AaronBurkinshaws poc dis.25

IRON AND STEEL.

Flat Bar.

1½ to 4 by ⅛ to 1 inch..... 2 20
4¼ to 6 by ⅛ to 1 inch..... 2 30
1¼ to 6 by 1¼ to 1¾ inch 2 60
1¼ &1¾ by ⅜ to ¾..... 2 30
1 & 1¼ by ⅜ to ¾..... 2 40
¾ ¾ and ⅞ by ⅜ to ¾..... 2 60

Round.

1 to 1¾ inch..... 2 30
2 to 2¾..... 2 40
2¾ to 3¼..... 2 70
3¾ to 4..... 3 20
4¼ to 4¼..... 3 70
4¾ to 5..... 3 90

Square.

1 to 1¾ inch..... 2 20
2 to 2¾..... 2 40
2¾ to 3¼..... 2 70
3¼ to 4..... 3 20
3¾ to ⅞..... 2 30

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch 2 40
1 to 1¾ by ¼ and 5-16 do 2 50
¾ to ⅞ by ¼ and 5-16 do 2 70
⅞ to 1 by ¼ and 5-16 do 3 10

Half Oval and Half Round.

Wagon box iron ¾ and ⅞ 3 80
1-10c per lb extra will be charged for cutting to specified lengths

Light Band.

1¼ to 6 by ¼ to 3-16..... 2 80

Hoops.

1¼ to 2, Nos 16 to 18..... 3 20
1¼ to 4 do 13 to 15..... 3 10
1-10 extra for each gauge lighter

Sheet Iron.

No 22 to 24..... 4 00
No 25 to 26..... 4 20
No 27..... 4 40
No 28..... 4 80

English Steel.

Best cast.....℔ lb 16c
Extra cast..... 16¾c
Round machinery.. 10c
Swaged, cast..... 18c
Best double shear... 15½c
Blister, 1st quality.. 13c
Refined tool steel..... 16¼c
Spring calking..... 7¼@7¾c
German steel, best.. 11c
2d quality..... 10c
3d quality..... 9c
Sheet cast steel, 1st quality..... 15½c
2d quality..... 14½c
3d quality..... 12½c

American Steel.

Best brands of refined cast steel, ¾ to 2 inches..12c
Crucible cast.....7c
Open-hearth ditto.... 4½c
Hammer cast steel.... 9c
Spring cast steel..... 7½c
Bessemer and open-hearth spring..... 5c
Ditto plow..... 4½c
Steel boiler plate.... 6½@7c
Bessemer machinery.5 @6c
Spring and calking...7¼@7½c
Tire..... 5
Sleigh shoe..... 5

Bessemer Steel Tire.

¾ to 1 by 3-32..... 4¼℔ lb
¾ to 1 by ¼ to 5-32 ... 4½℔ lb
¾ to 1 by 3-16 to ⅜ ... 4¾℔ lb

Miscellaneous Cast Steel.

Auger and auger bit..... 1
Axle steel for wagons..... 7
Frog points and plates.... 8
Frog size bars..... 8½
Pick, hammered..... 10
Mattock, beveled..... 9
Table cutlery..... 7½
Trap spring steel..... 10
Pike and cant hook..... 9
Coal and granite..... 8½

TINNER'S STOCK.

Tin.

Banca,.....per lb. 22½
Straits..... " 22c
English..... " 24c
Bar..... " 25c

Tin Plate,

IC 12x12 charcoal.....$ 6 75
IC 14x20 do..... 6 75
IX 14x20 do..... 8 75
DC 12½x17 do..... 7 00
DX 12½x17 do..... 9 00
DXX, 12½x17 do..... 11 00
DXXX, 12½x17 do..... 13 00
IC, 20x28 do..... 14 00
IX, 20x28 do..... 18 00
IC, 14x20, Best Roof.... 6 00
IX, 14x20, do..... 8 00
IC, 20x28 do..... 12 00
IX, 20x28 do..... 14 00
IC, 10x14 Best Coke..... 6 00

Solder.

Half and Half, in bars....15
No. 1 do.....12½
Spelter Solder.....30

Pat Planished Sheet Iron

[A].....per lb 10 8-10c
[B]..... 9 8-10c

Nos	10 to 14	15 to 20	21 to 24 & 26	25
Com	3-40	3-60	3-75	3-95
Char	5-60	5-80	6-00	6-20

Sheets over 28 in. wide ¼c extra.

Zinc.

Sheet, cask..... 5c
Sheet, open..... 7

Boiler Makers' Tools.

Doty's Power Shears..net list
" Hand Lever Shears net list
" Power Punch.....net list
" Hand Punch.....net list
Steel Screw Punch.....net list
Iron Screw Punch.....net list
Boiler Plate Rolls.....net list
Buffalo Forges&Blowers dis 20
Watson's " " net list
Spring Tube Expander..dis 15
Roller Tube Expander.net list
National Tube Cleaner..dis 20
Wire Flue Brushes.....net list
Anvils—'Peter Wright' 12½℔ lb
Solid Box Vises.....net list

Tinners' Tools & Machines.

Machines(P. S.&W.) list add 10
Tools (P. S. & W.).....add 20

Plumbers', Steam and Gas Fitters' Supplies.

Wrought Iron Pipe....dis 70
Mal'eable Iron Fittings.... list
Grey Iron Fittings....dis 50
Steam Brass Goods.....dis 55
Water " " dis 50
Ludlow Gate Valves...dis. 20
Register Gauge Cocks net 1 00
Montg'ry Gauge Cocks $1 each
Steam Gauges.....dis. 40
Steam Guages 5 in. net dial per doz.....30 00
Scotch Glass Tubes.....dis. 60
Tools.....special.
Duplex Injectors.....net.
Soil Pipe & Fittings, Mott's List.....dis. 30
Sinks, Mott's List.....dis. 25
Copper Bath tubs, sinks, etc.....dis. 25
Galvanized Iron Boilers "Scaifes."....dis. 50
Marble Slabs, Counter-sunk net per ft.....$ 1 25

Babbitt Metal.

Babbit metal, No. 3. 14 X... 42
Babbit Metal, No. 2, 16 XX.. 46
Babbit Metal, No. 1, 18 XXX.. 50
Babbit Metal, C..... 20
Babbit Metal, B..... 24
Babbit Metal, A..... 32
Dis 40 per cent.

LEAD.

Americ'n, ℔ lb..... 4¾c
Bar, ℔ lb 6¾c dis 10 per ct
Pipe, ℔ lb 6¾c dis 10 per ct
Sheet, ℔ lb 7¼c dis 10 per ct
Tin-lined pipe 15c dis 10 per ct
Block..... 45c.
Chilled Shot..... 8c

COPPER.

Lake Ingot..... 18c
Baltimore..... 16¾c
Arizona..... 17¼c

Sheathing Braziers Copper, Bolts, &c.

Brazier's Copper, ordinary sizes, 16 oz. per sq foot, and over per lb.....30c

Brazier's Copper, ordinary sizes, under 16 oz and over 12 oz. per sq foot, per lb. 32c

Brazier's Copper, 10 oz and 12 oz per sq. ft...per lb. 34c

Brazier's Copper lighter than 10 oz. per sq. ft...per lb 36c

Circles less than 84 inches in diameter...per lb. 33c

Circles 84 inches in diameter and over.....per lb. 30c

Segment and Pattern sheets per lb. 33c

Locomotive Fire Box sheets per lb. 30c

Sheathing Copper, over 12 oz. per sq. ft... per lb. 28c

Bolt Copper.....per lb. 30c

Copper Bottoms per lb. 31@32c

No copper is Sheathing except 14x10 inches, and not to exceed 34 oz. to the sq. ft.

Tinning.

14x48..... per sheet 6c

All other size sheets, 2½c per square foot For tinning both sides, double the above amount

SCRAP IRON AND OLD METAL.

DEALER'S SELLING PRICES.

Net Tons.

No. 1 wrought scrap $20@22
Sheet and hoop " .... 10@12
Cast scrap, (No. 1 heavy). 17@19
Cast Scrap (Stove Plate)14@13

OLD METALS.

Old copper per lb..... 13c
No. 1 H. Brass per lb... 10@12
Heavy yellow Brass do. 10@12
Light Brass per lb..... 7@8
Scrap Zinc per lb..... 8@4
Tea Lead per lb..... 3
Heavy Lead per lb..... 3½
Oily drillings..... 11
Cast borings..... 11
Machine shop wrt turnings $13
Axle turnings.....17 @ 20
Mixtturnings..... 12
Burnt castings.....8 @ 10
Malleable iron..... 10 00

GLASS.

(Per box of 50 feet)

SINGLE THICKNESS

6x8 to 10x15.....
11x14 to 15x24..... 8 50
16x24 to 20x28..... 9 75
15x34 to 24x30..... 10 75
26x28 to 24x36..... 11 50
26x36 to 26x44..... 13
26x46 to 30x50..... 14 00

DOUBLE THICKNESS

6x8 to 10x15..... 11 7
11x14 to 15x24..... 13 25
16x24 to 20x28..... 15 75
15x34 to 24x30..... 17 25
26x28 to 24x36..... 18 50
26x36 to 26x44..... 21 25

BRASS.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c per lb

High Bra.

All Nos not thinner than No. 28, wider than 2 in. not wider than 14 inch.....30c
All Nos to No. 28 inclusive, and widths over 14 to 20 in. inclusive.....35c
All Nos to No. 28, inclusive, and widths over 20 to 30 in. inclusive.....38
¼c per lb advance on each No above Nos 28 to 38, inclusive.
All Brass thinner than No. 8 is Platers' Brass at.....53c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 inches, in width wider than 2 inches 37c

Low Brass.

4c pr lb. more than High Brass
Gilding metal 8c per lb. more than High Brass.
Platers' or Gold Metal
In Bars.....46c
" Sawed.....51c
Planed or Polished...54c

For Slitting.

Metal in width in. to ⅛ in. to No. 28, inclusive, 1c per lb, advance.
Metal, in width 2 in. to 1 in. thinner than No 28, 2c per lb. advance.
Metal, in width ⅛ in to ¼ in. thinner than No 28, 5c per lb. advance.
Metal ¼ in. in width and less, 10c per lb. advance.
Any of the above widths cut to particular lengths add 7c per pound.

PIPE, WROUGHT.

Standard Wrought Iron Lap Welded Steam and Gas Pipe

Inside Diameter, Inches.	Plain, Price Per Foot.	Galvan. or Enameled Per Foot.	Outside Diameter Inches.	Weight Per Foot.
⅛	08		.40	.24
¼	08	$0 11	.54	.42
⅜	09	12	.67	.56
½	11	15	.84	.85
¾	13½	19	1.05	1.13
1	19	28	1.31	1.67
1¼	27	40	1.66	2.26
1½	33	47	1.90	2.69
2	46	64	2.37	3.66
2½	75	1 00	2 87	5.77
3	95	1 30	3.50	7.55
3½	1 25	1 70	4 00	9 05
4	1 50	2 05	4.50	10.73
4½	1 75	2 40	5.00	12 49
5	2 25	3 00	5.56	14.56
6	2 75	4 00	6.62	18.76
7	3 75	...	7.62	23.00
8	4 75	...	8.62	28.00
9	6 50	...	9.68	34.44
10	8 00	...	10.75	40.64
12	12 00	...		54.65

Discount, 70 per cent

COAL.

WHOLESALE.

Wholesale f.o.b. cars at Cleveland:

Carbon Hill and Monday Creek.....$2 60
Massillon.....2 80
Brier Hill.....3 50
Pittsburgh.....3 00
Salineville.....2 25
Tuscarawas.....2 25

RETAIL.—Delivered.

Massillon Lump.....$4 00
" Nut.....3 75
Carbon Hill and Monday Creek, lump.....3 50
Carbon Hill and Monday Creek, nut.....3 25
75c less on cars by car load.
Anthracite Stove and Chestnut.....7 00@7 25
Egg and grate.....7 00

OILS.

Pure Oils. p'kages included

Sperm, winter bleached per gal.....1 30@1 35
Whale, winter bleached per gal.....70@0 75
Straits.....50@53
'A' oil for tanner's use 35 @40
Lard oil extra W S.. 90@95
do No 1 do.....77@78
do No 2 do.....65@68
Tallow oil.....75@78
Neatsfoot oil pure.. 95@$100
do No 1.....80@85
Linseed oil, raw.....55
do do boiled.....58
Cotton seed oil white 60 @ 63
do do yellow 57 @ 62
West Virginia lubricating 28 deg.....20c@30c
Paraffine oil winter pressed.....25@ 30
Machinery.....40
Engine.....50
Miners' oil.....57@60
Drilling oil.....40
Turpentine, per gal..59

Hides and Leather.

Prime cured hides,...8½@8¾
Green hides.....6@6½
Bull, scrubby, badly scored or damaged, cured, two-thirds price.
Prime dry hides.....12@14
Horse hides, green 1 75@$2 00
Prime cured veal calf,12½@13
Ohio Deacons, Salted. 6@7
Pelts, wool on.....
Fresh slaughter sheep 30
Prime cured calf skins 18
Hemlock rough.....23@24
Oak harness.....34@40

ORIGIN OF THE STEAM HAMMER.

A Most Interesting Account of a Great Practical Invention.

Under this head the Mechanical World (England) says: Patricroft is the birthplace of the steam hammer, the inventor of which marked the commencement of a new era in mechanical progress. The hammers previously in use were those called "tilt" or "helve" hammers, and these were worked either by steam, water or hand power. Helve hammers are even now in existence in some forges. The larger the object operated upon by such hammers, the lighter is the blow that is dealt, and, conversely, the smaller the object, the heavier the blow. The difficulty which presented itself to the mind of Mr. Nasmyth, of forging large masses of iron with such an imperfect tool, led to his invention of the "direct action steam hammer," which has played no unimportant part in the mechanical progress of this generation. It was in the early part of the year 1837 that the directors of the Great Western Steamship Company sent Mr. Francis Humphries, their engineer, to consult Mr. Nasmyth as to some engineering tools of unusual size and power, which were required for the construction of the engines of the steamship Great Britain. They had determined to construct those engines on the vertical trunk engine principle in accordance with Mr. Humphries's designs, and very complete works were erected by them at their Bristol dock-yard for the execution of the requisite machinery, the most important of the tools being supplied by Messrs. Nasmyth, Gaskell & Co. The engines were in hand when a difficulty arose with respect to the enormous paddle-shaft of the vessel, which was of such a size of forging as had never before been executed. Mr. Humphries applied to the largest engineering firms throughout the country for tenders of the price at which they would execute this part of the work, but to his surprise and dismay he found that not one of the firms he applied to would undertake so large a forging. In his dilemma he wrote to Mr. Nasmyth on the 24th of November, 1838, informing him of this unlooked-for difficulty. "I find," said he, "there is not a forge-hammer in England or Scotland powerful enough to forge the paddle-shaft of the engine for the Great Britain. What am I to do? Do you think I may dare to use cast iron?"

This letter immediately set Mr. Nasmyth thinking. How was it that existing hammers were incapable of forging a wrought iron shaft of thirty inches diameter? Simply because of their want of compass, or range and fall, as well as power of blow. A few moments' rapid thought satisfied him that it was by rigidly adhering to the old traditional form of hand-hammer—of which the "tilt," though driven by steam, was but a modification—that the difficulty had arisen. When even the largest hammer was tilted up to its full height, its range was so small that when a piece of work of considerable size was placed on the anvil the hammer became "gagged," and, on such an occasion, where the forging required the most powerful blow, it received next to no blow at all, the clear space for fall being almost entirely occupied by the work on the anvil. The obvious remedy was to invent some method by which a block of iron should be lifted to a sufficient height above the object on which it was desired to strike a blow, and let the block fall down upon the work—guiding it in its descent by such simple means as should give the required precision in the percussive action of the falling mass. Following out this idea, Mr. Nasmyth at once sketched on paper his steam hammer, having it clearly before his mind's eye, a few minutes after receiving Mr. Humphries's letter narrating his unlooked-for difficulty, and by the same day's post the sketch of the invention by which Mr. Nasmyth proposed to forge the Great Britain paddle-shaft was sent to him, and he showed it to Mr. Brunel, the engineer-in-chief of the company, and to others, by all of whom it was heartily approved. The paddle-shaft was, however, never forged for the Great Britain.

About that time the substitution of the screws for the paddle-wheel as a means of propulsion of steam vessels was attracting much attention, and the performances of the Archimedes were so successful as to induce Mr. Brunel to recommend his directors to adopt the new power. The great engines which Mr. Humphries had designed were accordingly set aside, so neither his great paddle-shaft nor Mr Nasmyth's steam-hammer to forge it was any longer needed by him. In passing, we note that Mr. Wilson, who eventually played so important a part in the development of the steam-hammer, was the first to bring out the screw propeller in a practical form, namely, in 1828. The hammer was left to bide its time until an opening for its utilization should appear. When in France, in April, 1840, and passing through the iron works at Creuzot, with M. Bourdon, the practical mechanic there, Mr. Nasmyth saw a crank axle of unusual size. He immediately asked, "How did you forge that shaft?" M. Bourdon's answer was, "Why, with your hammer, to be sure!" Great, indeed, was Mr. Nasmyth's surprise, for he had never yet seen the hammer, except in his own drawing. A little explanation soon cleared all up. Mr. Gaskell, Mr. Nasmyth's partner, had, on a visit of MM. Bourdon and Schneider to Patricroft, whilst he was away, shown, as an act of courtesy, Mr. Nasmyth's sketch of the hammer, and had considered the matter too trivial to be mentioned to him M. Bourdon said that he had been so much struck with the ingenuity and simplicity of the arrangement that he had no sooner returned than he had a hammer made in general accordance with the design Mr. Gaskell had shown him, and that its performance had answered his every expectation. Mr. Nasmyth was taken to see the hammer, and great was his delight to see the child of his brain in full and active work. He applied for a patent on Jan. 9, 1842, which was enrolled on Dec. 9, the same year. It was about six months after the patent was secured, namely, at the end of 1842, or the beginning of 1843, when his first hammer was finished. It was a hammer of thirty hundredweight, falling weight, and was made for the Patricoft works. From the moment it commenced to work the steam hammer became a recognized power in modern mechanics.

James Watt took out a patent, April 28, 1784, for "Heavy hammers or stampers, for forging or stamping iron, copper, or other metals, or other matters without the intervention of rotative motions or wheels, by fixing the hammer or stamper to be so worked, either directly to the piston or piston rod of the engine"; and Mr. W. Deverell also took out a patent June 6, 1806, in which he says: "This invention consists in giving motion to hammers and various other contrivances for stamping," etc.; and then he proceeds to state he "first causes steam to be raised in a boiler or steam vessel, as in the common way, having a steam cylinder with a piston and a piston rod in it, at the end of which is a hammer, either made fast to the rod oy welding or in any other proper way; the steam from the boiler or steam vessel as aforesaid, is let in underneath the piston by means of an opening cock or valve, the air at the top of the piston will then be compressed by the superior pressure of the steam underneath the piston; after the piston has been raised to a given height there will be an opening made from the under side of the piston and a vacuum formed, as in the common way, or otherwise the steam may be let out into the common air The compressed air on the top of the piston will then force down the hammer with a velocity equal to what it may be compressed."

Both these specifications unmistakably shadow forth the direct action steam hammer, but neither Watt nor Deverell appear to have carried their ideas on the subject into practical operation. Although these specifications existed, it is indisputable that Mr. Nasmyth's form of hammer was his own invention, and since the expiration of his patent, in 1856, a host of firms hove adopted principles embodied in his make of hammer. The field for the usefulness of the steam hammer, as at first put into practical form, was not large. It was then only applicable for massive forgings, the demand for which was then rare. In order that the idea of a hammer worked by the direct action of steam might be extended to the manufacture of all ranges of forging, from the smallest to the greatest, it was necessary that it should be workable at high speed and be self acting. Nasmyth's first type of hammer had a valve motion which could only be worked by hand, and that with much labor. The utility of the machine was therefore much restricted. The conditions to be fulfilled by self-acting apparatus were, that the height to which the hammer would rise should be capable of adjustment, in order to have complete command over the power of the blow; and that the instant the blow was struck the hammer should again rise, so that not only no loss of time should ensue, but also that the heat in the mass of iron on the anvil might not be reduced nor carried off by the cold face of the hammer.

The peculiar difficulty of insuring a true automatic arrangement will be seen when it is considered that the instant of percussion must vary with almost every blow that is struck, for the piece on the anvil becomes thinner and thinner by each succeeding blow, and in flat bars a blow is first given on the flat side and then on the edge, the difference in the fall of the hammer in the two cases being oftentimes several inches; and farther, that the hammer must be under perfect control at all times.

Mr. Wilson, the manager for Mr. Nasmyth, solved the problem in 1843. He invented a self-acting motion by the application of which hammers could be made capable of forging an Armstrong gun, or cracking a nut whithout breaking the kernel, and be under such complete control that whilst the top was descending with its greatest momentum, it could be arrested at any point with even greater ease than any instrument used by hand. The steam hammer was further improved by Mr. Wilson by the introduction in July, 1856, of his patent "balanced slide valve," and in June, 1861, by his patent "double-acting hand-gear motion." By these steam can be admitted, the underside of the piston only and to work single-acting, and be admitted to the top side of the piston also, when sharper or more powerful blows are required, and the change from single to double action, and vice versa, can be effected instantaneously and in the simplest manner, and the height of fall and therefore force of blow, varied as required by the attendant at the handle by which the balanced slide valve is moved. In May, 1862, Mr. Wilson designed and erected a small steam hammer specially for working small steel, which requires a great speed. The hammer block was of wrought iron and weighed with the piston rod about two hundredweight. The hammer was fitted with the balanced valve, double-acting, and with an entirely new self-acting motion, much simpler and less complicated than the original one, capable of striking 500 blows per minute with a precision and certainty of action truly astonishing.

A Leviathan Lathe.

Says the Engineering Review, London: "Messrs. Smith, Beacock and Tannett, of the Victoria Foundry, Leeds, have just completed a large treble-geared crank axle lathe, which has been made for a marine engineering firm in Marseilles, where it will be used for turning marine cranks, shafts, &c. It is probably the largest piece of work of its kind which has ever been constructed in Leeds. The height of the centres above the bed is 5 ft., so that an article 10 ft. diameter can be turned with the lathe. The face plate, which is 10 ft. 4 in. in diameter, is provided with jaws for gripping the work. The lathe bed is 9 ft. wide, and is sufficiently long to allow a space of 34 ft. between the centres. There are two saddles, each with compound slide rests, back and front, and having self-acting motions in all directions.

REFERRING to the recent Cincinnati flood, the Trade List says: A competent engineer estimates that a levee eighteen feet high and sixteen feet in width, upon both sides of the river, will preserve Cincinnati, Covington, Newport and neighboring localities from the disasters consequent upon high water, and he feels certain that the cost of such levee will not exceed the damage experienced at the points named from the flood now subsiding.

The Restoration of Ohio Canals.

[From the Akron Beacon.]

The Cleveland TRADE REVIEW seems to accept as gospel truth the estimates from the State Board of Public Works that it will cost only $6,845 (exact cents not given) to repair all the damage by the recent floods to the Miami Canal, and that $13,328 will put the Ohio Canal in navigable condition from Cleveland to Portsmouth. Accepting these estimates bodily, the REVIEW thus comments:

"With the discovery of these facts, the cry that the Ohio public works were damaged beyond redemption has suddenly ceased. It looks very much, indeed, as if it were started for a purpose."

As we have before said, the Beacon will be glad to have these estimates substantiated by the actual expenditures, but until that is done and the canals are again put in order for anything near the small sums named, we prefer to reserve our opinion as to whether these mere estimates are "facts." And when that time comes that all of us have the results of actual work done and paid for, before us in actual dollars and cents, it will then be in order to determine just where "a purpose" of evil intent to the public interest, is to be found.

The New Mecca Oil Field.

Concerning the new "finds" of lubricating oil at Mecca, Trumbull County, O., the Warren correspondent of the Youngstown News-Register writes: Two holes, eight inches in diameter, have been sunk to a depth of 38 feet. There is one pump at each hole so that there is constantly flowing a large volume of water. The water is caught in tanks, about eighteen feet square and two feet high and separated into apartments by partitions, which are adjustable. When the first apartment is nearly filled the partition is partially raised and the water allowed to run off. The oil having risen to the surface remains, and is skimmed off and placed in barrels. While we were there the well was yielding steadily pure oil at the rate of one barrel per hour, and the engineer thought that a run of twenty-four hours would produce fifteen barrels. This, with oil at twenty dollars per barrel, will pay handsomely. The Mecca Oil Company has contracted for more wells, but there is an abundance of adjacent territory yet unleased. A market is afforded by the above company, which purchases nearly all that is produced and clarifies it at its works in Cortland. No better lubricating oil is produced. It surpasses in all good qualities, and its specific gravity is 24.

$1,000 Offered for a Historic Stove.

There is in the venerable church at Derry an old-rashioned ten-plate stove, which was made at Colebrook furnace, Lancaster county, where nearly a century ago most of the stoves used in Pennsylvania were manufactured. It is a unique piece of furniture, a relic of the old-fashioned charcoal furnace, which did the smelting of iron ore in the olden time, Colebrook, Elizabeth, and Conawingo furnaces, in Lancaster county, were the principal charcoal furnaces in the State, the two former being owned by Robert Coleman, the founder of the Coleman family, now so extensively engaged in the smelting of iron at Cornwall, Lebanon county, and the vicinity of Lebanon borough. This Robert Coleman began life as a woodchopper, rose to a clerkship, and finally became the owner of the furnaces, with a joint title in the inexhaustible mines at Cornwall. The old stove at Derry was the first made by Robert Coleman, and one of the last in existence, has become a coveted object among the Colemans at Lebanon, or at least such is the story in that vicinity. The family of the late G. Dawson Coleman, it is represented, offered the trustees of the church $500 for the old stove, while Robert Coleman, son of the late Robert Coleman, of Cornwall, offered $1,000 for it. Will the Derry congregation, which is proud of the classic character of its church, give up so rich an historical object as the ten-plate stove, around which the patriots of the Revolution gathered and the Christian warriors of a century knelt in prayer?—[Harrisburg Independent.

Will there be Much Railway Building During 1883?

Judging from the lists of new companies incorporated in the various states and territories in the year 1882 alone, we should say, decidedly, yes. These lists show the following results: Ohio, 40 railway companies incorporated, whose proposed mileage we roughly estimate at 2,500 miles; Iowa, 19 companies, projecting about 2,000 miles; Montana territory, locked in among the mountains, 3 companies, proposing some 290 miles, and Dakota territory, 9 companies, contemplating about 1,385 miles; making a total for these four states and territories of 72 companies whose projected mileage is something like 6,175 miles! Of course some of this mileage will not be built, but upon no small part of it work is likely to be in progress within a few months. We shall show hereafter what some of the other states propose to do.—[Railway Age.

A New Safety Lamp.

M. Mareaut has been experimenting before the Societe de l' Industrie Minerale de Saint-Etienne on the Mueseler and other safety lamps. As the result of his experiments, M. Marsaut has constructed a modified lamp of the Mueseler type, in which no less than 5,500 explosions have taken place without their being communicated to an explosive mixture on the outside. In this lamp the air must follow a tortuous course to reach the flame. A wire gauze, with 929 meshes to the square inch, envelopes the chimney, and takes the place of the Mueseler diaphragm.—[Iron, Jan. 19.

J. M. Allen, Pres. Wm. B. Franklin, V. Pres.
J. B. Pierce, Sec'y.

Hartford

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INSPECTION AND

INSURANCE CO.

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9 Chief Inspector.

MACHINERY FOR
Straightening and Cutting Wire
Of all Sizes to any Length.
Send for Catalogue.
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New Haven, Conn., U. S. A. 92

PURE PREMIUM BONE.

The tried and never failing Fertilizer in all grains and grass crops. It has proved its value as such by years of actual use all over the world. Circulars and Price List free. Address all letters pertaining to the purchase of Premium Bone, or the sale of bones, to
7 **Excelsior Fertilizer Works,**
Salem, Columbiana County Ohio.

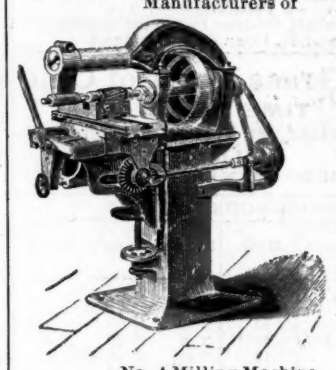
REST not, life is sweeping by, go and dare before you die, something mighty and sublime leave behind to conquer time." $66 a week in your own town. $5 outfit free. No risk. Everything new. Capital not required. We will furnish you everything. Many are making fortunes. Ladies make as much as men, and boys and girls make great pay. Reader, if you want business at which you can make great pay all the time, write for particulars to H. HALLETT & Co., Portland, Maine.

ELECTRO-PLATING WORKS,
Salem, Ohio.
Machine Finishing and Electro Plating
In Gold, Nickel and Silver.
SEND SAMPLE FOR SPECIAL ESTIMATE.
ALFRED F. SMITH, Salem, O.

TRUCK HUBS.
Black Birch Carriage, Wagon and
TRUCK HUBS.
Sizes from 3½x6½ to 18x22.
R. M. WHITNEY,
32 OLEAN, Cattaragus Co., N.Y.

MALLEABLE IRON CASTINGS
TO ORDER.
Air Furnace Process.
QUALITY GUARANTEED. SEND FOR ESTIMATES.
SPECIALTIES IN SADDLERY AND WAGON HARDWARE.
51 THE YOUNGSTOWN MALLEABLE IRON CO., YOUNGSTOWN, O.

E. E. Garvin & Co.,
Manufacturers of



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BOILER MAKER
And Sheet Iron Worker.
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Special attention paid to taking out and Piecing Portable Flues.
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Expanding Water Conductor
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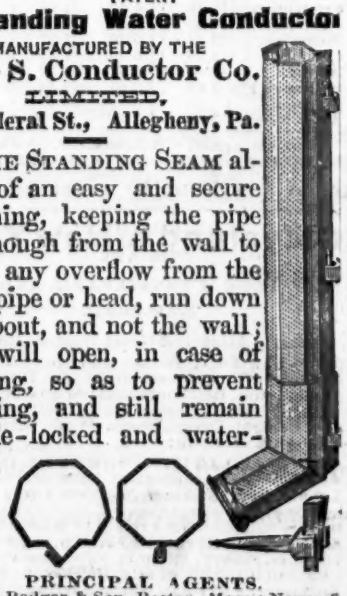
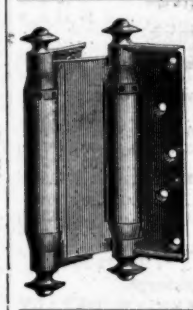
47 Federal St., Allegheny, Pa.

THE STANDING SEAM allows of an easy and secure fastening, keeping the pipe far enough from the wall to make any overflow from the eave pipe or head, run down the spout, and not the wall; and will open, in case of freezing, so as to prevent bursting, and still remain double-locked and watertight.



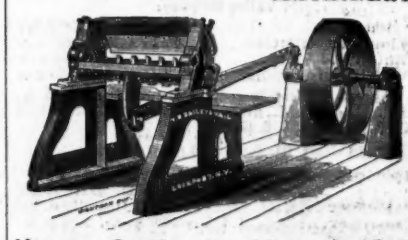
PRINCIPAL AGENTS.
E. B. Badger & Son, Boston, Mass.; Noyes & Wines, New York; J. S. Thorn, Philadelphia; John G. Hetzell, Baltimore, Md.; R. P. Gormully, Chicago; F. Schmidt & Sons, Milwaukee; Shackelton Bros., Cleveland; Patterson & Hayes, Erie, Pa.; G. H. Peters & Son, Buffalo, N. Y.; James Ackroyd, Albany, N. Y.; Witt & Brown, Cincinnati,; Hull & Cozzens' Mnfg Co., St. Louis, Mo., and many others.

ECLIPSE ELECTROTYPE AND ENGRAVING CO.,
147 St. Clair-st., Cleveland, O.
C. W. DEAN - - Manager.
All Work Warranted First Class.
Send for Prices. 5-84



THE COMPOUND
SPIRAL SPRING HINGE,
has the lightest and
Most Elastic Movement
combined with
THE GREATEST POWER.
Manufactured by
LORENZ BOMMER,
84 Pearl Street, cor. Front,
BROOKLYN, N.Y. 8

I. E. MERRITT,
MANUFACTURER AND BUILDER OF
MILLING MACHINES.
KEY-SEATING MACHINES.
AUTOMATIC SAWING MACHINES.
SHINGLE, HEADING,
STAVE, AND HANDLE
MACHINERY.



Vaneer Cutting Machines for Cutting Berry Box and Picture Back Lumber from the Log.
Also Second-hand Machinery of all kinds.
Lockport, N. Y.
Send for Catalogue.

Payne's Automatic Engines

Established 1840.

Reliable, durable and economical, will furnish a horse power with ¼ less fuel and water than any other engine built, not fitted with an automatic cut-off. Send for illustrated Catalogue No. 20 for information and prices. B. W. PAYNE & SONS, Box 1136, Corning, N. Y. 7

Excelsior Coal Co.,
Akron, Ohio.
Miners and Dealers in
EXCELSIOR LUMP, NUT AND SLACK.
Mines at Silver Creek, O., on N. Y., P. & O. R. R.
These Coals are Pronounced Among the Very Best by M. C. Read, Assistant State Geologist, and E. W. Morley, Professor of Chemistry, Adelbert College. 73
J. WAGONER, President. C. F. WAGONER, Secretary.

TRAVELERS' RECISTER.

Lake Shore & Michigan Southern.

TRAINS GOING EAST.	Arrive. From West.	Depart. From East.
Fast N. Y. Express	*1 35 a m	*1 50 a m
N.Y.,Bo't'n & At. Ex.	*7 05 a m	*7 30 a m
Elyria Accommodation	†8 35 a m	.....
Pt.Clinton Accomd'at'n	†11 00 a m	.....
Buffalo Accommodation	†11 00 a m	†11 15 a m
N. Y and B't'n Fast Ex.	*2 25 p m	*2 55 p m
Conneaut Accom'dation	.....	†4 50 p m
Night Express	†10 10 p m	†10 35 p m

TRAINS GOING WEST.	Arrive. From East.	Depart. From west.
Fast Limited Express	*12 28 a m	*12 33 a m
Mich. Ex. via Sandusky	*2 50 a m	*3 05 a m
Chi. Ex. via Sandusky	†6 35 a m	7 00 a m
Mich. Ac. via Norwalk	.....	†6 40 a m
Conneaut Accom'dat'n	†8 40 a m	.....
Toledo Ex. via Norwalk	†1 25 p m	†3 30 p m
St. Louis Ex.via San'ky	*1 40 p m	*2 05 p m
Chi. Pac.Ex. via Nor'lk.	*7 05 p m	*7 35 p m
Pt.Clinton Accom'dat'n	.....	†5 00 p m

Sunday trains for Nottingham—Depart 0:00 a. m. and 2:15 p. m., return at 10:05 a. m. and 4:45 p. m.

Reference marks—*Daily. †Daily except Sunday. ‡Daily except Monday.

Cleveland, Columbus, Cincinnati & Indianapolis.

ARRIVALS.

No. 2 Col. & Cin. & Ind'polis Ex.	*7 10 A.M
No. 8 C. T.V. & W. & Clev. Accom.	10 30
No. 12 St. Louis & New York Exp.	*3 00 P.M
No 6 Indianapolis & Columbus Exp	10 20
No. 4 Columbus & Cincinnati Exp.	*3 40
No. 10 Wheeling Express	7 15

DEPARTURES.

No. 1 Cincinnati & Columbus Exp.	*8 00 A.M
No. 11 Cleve, Indianap.&Wheel'g Ex	7 10
No. 3 Special St.Louis & Cin. Ex.	**1 55 P.M
No. 5 Night Express	*7 25
No. 7 C.T.V. & W. & Col.Accom	4 00

**This train runs daily to Indianapolis and St. Louis, and daily, except Sunday, to Cincinnati.

Cleveland, Tuscarawas Valley & Wheeling.

ARRIVALS.

Wheeling & Cleveland Express	7 15 P.M
Uhrichsville Express	10 15 A.M

DEPARTURES.

Wheeling & Cleveland Express	7 10 A.M
Uhrichsville Express	4 00 P.M

New York, Pennsylvania & Ohio.

ARRIVALS.	a.m.	a.m.	p.m.	p.m.
Through from East	6 50	.....	.....	*7 00
N.Y. P. & O. (Mah'g)	10 55	.....	2 00	*7 00
Pittsburgh Express	.....	.....	2 00	*7 00
Pitts'g& Yo'gs'tn Ac.	10 55	.....	.....	10 15
DEPARTURES.	**a.m.**	**a.m.**	**p.m.**	**p.m.**
Through E'tern Train	*7 10	.....	.....	10 45
N. Y. P. & O. (Mah'g)	.....	.....	.....	4 25
Yo'gs'tn & Pitts'g Ac.	.....	11 00	.....	.....
Pittsburgh Express	.....	*7 10	*2 30	.....

Cleveland & Pittsburgh.

	ARRIVE.	DEPART
Pittsburg & Wheeling	2 30 P.M	8 25 A.M
Express	7 30	2 00 P.M
Alliance Accommodation	10 10 A.M	3 45
Ravenna Accommodation	8 37	5 30
Night Express	6 25 A.M	†11 40 P.M
Newberg Accom'dation	12 10 P.M	11 00 A.M
Newberg Accom'dation	1 50 P.M	12 30 P.M

†Night Express runs daily, except Saturday, by way of Wellsville, and on Saturday by way of Alliance.

Valley Railway.

	ARRIVE.	DEPART
Wheeling Junction	10 15 A.M	8 30 A.M
Canton	1 30 P.M	5 00 P.M
Wheeling Junction	6 15 P.M	3 20 P.M

Special trains leave on Sunday at 8.25 A. M. and 4.20 P.M., arriving at Cleveland at 1005 A. M. and P. M. 6.25

Depot foot of South Water Street.

Connotton Valley Railway.

	ARRIVE.	DEPART
Passenger	8 00 a. m.	8 10 a. m.
Passenger	10 20 a. m.	2 00 p. m.
Passenger	6 35 p. m.	4 25 p.m.

Depot corner Commercial and Fifth Streets

Cleveland, Akron & Columbus Railroad,

Cleveland, Akron & Columbus Railroad, running over Cleveland & Pittsburgh Railroad to Hudson, for Akron, Columbus, etc.

	ARRIVE.	DEPART.
Mail	2 30 P.M	8 25 A.M
Express	7 30	2 00 P.M
Accommodation	10 10 A.M	3 45 P.M

"The Nickel Plate."

	ARPIVE.	DEPART
Local Passenger	10 00 P.M	3 48 P.M
Local Passenger	9 18 A.M	6 55 A.M
Conneaut Accom'dation	9 05 A.M	4 30 P.M

CLEVELAND & PITTSBURGH

RAILROAD.

Condensed Time Table of Passenger Trains, corrected to Jan. 21, 1883.

MAIN LINE—GOING WEST.

	Dy Exr'ss.	Mail Expr'ss.	Fast Line.	Accom.
Leave				
Pittsburgh	8 30a m	1 55 pm	11 50 pm	4 00 pm
Allegheny	8 40	2 05	12 00 am	4 10
Arrive				
Rochester	9 25	2 55	12 50	4 55
Beaver	9 30	3 01	12 56	5 01
E. Liver'l	10 07	3 34	1 38	5 43
Wellsville	10 18	3 45	1 50	5 55 pm
Salineville	10 57	4 22	2 33	Arrive.
Bayard	11 35	4 57	3 20	.....
Alliance	12 05p m	5 25	3 55 am	.....
Leave				
Alliance	12 20	5 30	4 05	7 40 am
Arrive				
Ravenna	12 58	6 03	4 44	8 20
Hudson	1 24 pm	6 27	5 12	8 50
Cleveland	2 30 pm	7 30 pm	6 25 am	10 10 am

mmodation train leaves Ravenna at 6:50 a.m., and arrives at H dson at 7:20 a.m., Cleveland 8:37 a.m.

☞Fast line and Day Express run through Sleeping Cars from Pittsburgh to Cleveland.

NOTE.--Fast Line leaves Pittsburgh Sunday nights, but not on Saturday nights.

MAIN LINE--GOING EAST.

	Pittsb'g Expr'ss	Fast Line.	Day Expr'ss.	Accom.
Leave				
Cleveland	8 25am	2 0pm	11 40pm	3 45pm
Arrive				
Hudson	9 32	3 00	12 50am	4 50
Ravenna	10 06	3 2:	1 20	5 23
Alliance	10 49	3 58	2 00	6 00
Bayard	11 20	4 27	2 50	.....
Salineville	12 10pm	5 10	3 40	Leave.
Wellsville	12 50	5 40	4 35	8 00ALI
E.Liverpool	1 20	6 05	4 57	8 11
Beaver	1 59	6 40	5 47	8 54
Rochester	2 05	6 45	5 52	9 00
Allegheny	2 55	7 35	6 45am	9 50
Pittsburgh	3 05	7 45	6 55	10 00am
Harrisburg	.....	4 15am	4 00pm	.....
Baltimore	.....	7 45	7 20	.....
Washington	.....	9 15	8 47	.....
Phila	.....	7 50	7 35	.....
New York	.....	11 15	10 35	.....
Boston	.....	8 00pm	.....	.....

Accommodat'on train leaves Cleveland Union Depot at 3:30 p. m., arrives at Hudson at 6:58 p. m., Ravenna 7:20 p. m.

All trains connect at Yellow Creek for Wheeling and Bellaire.

☞Fast Line runs through Sleeper to New York. Day Express runs through Sleeper to Pittsburgh.

WM. A. BALDWIN, Manager, E. A. FORD, Gen. Pass. & Tkt Agt. Pittsburgh.

C. L. Kimball, District Passenger Agent, corner Bank and St. Clair sts., Cleveland.

Blue Grass Route of Ohio

TIME TABLE.

The Cleveland, Mt. Vernon and Delaware RAILROAD.

GEO. D. WALKER, RECEIVER.

SOUTH-BOUND TRAINS

	Mail.	Expr'ss.	Acc'm	Acc'm
Leave.				
Cleveland	8 25 am	2 00 pm	3 45pm	.....
Hudson	9 40	3 10	5 00	.....
Cuyahoga F's.	9 57	3 27	5 20	.....
Akron	10 12	3 42	5 47	.....
Clinton	10 42	4 14	6 19	.....
Warwick	10 47	4 19	6 25	.....
Orrville	11 14	4 45	6 51	.....
Fredricksburg	11 45	5 17	7 23	.....
*Holmesville	11 55	5 27	7 33	.....
Millersburg	12 08	5 40	7 45	5 35
*Killbuck	12 22 pm	5 54	.....	5 49
Gann	1 00	6 53 S	.....	6 49 B
Danville	1 11	7 04	.....	7 01
Gambier	1 31	7 24	.....	7 21
Mt. Vernon	1 45	7 38	.....	7 34
*Mt. Liberty	2 07	8 00	.....	7 53
Centerburg	2 19	8 12	.....	8 05
*Condit	2 33	8 26	.....	8 19
*Sunbury	2 48	8 36	.....	8 29
Westerville	2 05	8 59	.....	8 52
Columbus	3 30	9 25	.....	9 20
Cincinnati	8 00	.....	.....	.....

NORTH-BOUND TRAINS.

STATIONS.	Expr'ss.	Mail.	Acc'm	Acc'm
Leave				
Cincinnati	.....	8 00 am	.....	.....
Columbus	7 20 am	12 25 pm	.....	5 15 pm
Westerville	7 45	12 50	.....	5 43
*Sunbury	8 08	1 11	.....	6 06
*Condit	8 19	1 21	.....	6 17
Centerburg	8 33	1 35	.....	6 31
*Mt. Liberty	8 45	1 47	.....	6 44
Mt. Vernon	9 11	2 12	.....	7 08
Gambier	9 24	2 25	.....	7 24
Danville	9 44	2 45	.....	7 44
Gann	9 57	2 57	.....	7 56
*Killbuck	10 35	3 35	.....	8 32
Millersburg	10 51	3 50	5 45am	8 45
*Holmesv'e	11 04	4 03	5 58	.....
Fredricksb'g	11 15	4 12	6 08	.....
Orrville	11 50	4 45	7 10 B	.....
Warwick	12 14	5 10	7 37	.....
Clinton	12 19	5 15	7 46	.....
Akron	12 50 pm	5 47	8 20	.....
C'yahoga F's	1 02	6 01	8 33	.....
Hudson	1 20	6 20	8 53	.....
Ar. Clevel'd	2 30	7 30	10 10	.....

* Stop on signal. B Breakfast. S Supper.

N. MONSARRAT, Gen'l Supt. Akron, O

E. T. AFFLECK, General Passenger Ag't, Columbus, O.

Cleveland to New York,

VIA THE

NEW YORK, PENNSYLVANIA AND OHIO RAILROAD.

Formerly Atlantic & Great Western Railroad]

For New York, Boston and the East. The shortest and quickest route to Pittsburgh, Washington, Baltimore and the Southeast.

Until further notice trains will leave the new Central Depot, South Water Street and Viaduct, as follows:

7:10A.M. LIGHTNINGEXPRESS (daily) sleepingand hotel coaches from Leavittsburg. 8:55 a.m. To New York, Albany and Boston without change. Parlor car, Cleveland to Salamanca. Arrives at Meadville 11:20 a.m., (dinner); Franklin, 12:33 p.m.; Oil City, 1:00 p.m.; Corry, 1:00 p.m.; Jamestown, (Lake Chatauqua) 1:57 p. m.; Buffalo, 6:15 p. m.; Rochester, 8:30 p.m.; Hornellsville, 6:40 p. m., (supper); Corning, 8:25 p.m.; Elmira, 8:57 p.m.; Binghampton, 10:58 p.m.; Albany, 6:00 a.m.; Boston, 2:45 p.m.; arriving at New York, 6:50 a.m.

11:05 P.M. NIGHT EXPRESS, (daily except Sunday), Sleeping Coach from Leavittsurg to New York without change. Arrives at Youngstown, 1:45 a.m.; Pittsburgh, 6:15 a. m.; Washington 9:15 a. m.; Baltimore 10:34 p. m.; Meadville, 3:50 a. m.; Corry, 5:20 a.m.; Jamestown, 6:22 a.m.; Buffalo, 9:45 a. m.; Rochester, 1:10 p. m.; Hornellsville 1:20 a. m.; Corning, 12:53 p. m.; Elmira 1:21 p. m.; Binghampton, 2:50 p.m.; New York 9:25 p.m.

2:30 P.M. PITTSBURGH EXPRESS, daily, through without change. Parlor Car, Cleveland to Pittsburgh, arrives at Youngstown, 5:00 p.m.; Pittsburgh, 7:48 p.m.; Washington, 7:30 a.m.; Baltimore, 8:19 a.m.; via Sharon to Meadville, arriving 7:35 p. m.

4:25 P.M. MAHONING ACCOMMODATION, stopping at all way stations. Arrives at Youngstown, 7:25 p.m; Sharon, 8:30 p.m; Sharpsville 8:40 p. m; connects at Leavittsburg with train No. 20 for Meadville and intermediate points, arrives at Meadville, 11:05 p.m. Pittsburgh, 10:48 p. m.

7:10 A.M. PITTSBURGH EXPRESS, —(daily) through without change. Arrives at Youngstown, 9:50 a.m.; Sharon, 10:55 a.m.; Sharpsville, 11:05 a.m.; Pittsburgh, 12:45 p.m. Returning, leave Pittsburgh, 4:48 a.m., 8:33 a.m., and 1:18 p. m. and 4:20 p.m.

11:00 A.M. YOUNGSTOWN& PITTSBURGH Accommodation, stopping at all Way Stations, arriving at Youngstown 1:50 p.m.; Pittsburgh, 6:10 p.m. Trains arrive at Cleveland, 6:50 a.m., 7:00 p. m., 10:55 a. m 2:00 p.m., and 10:15 p.m.

☞This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City, and intermediate points WITHOUT CHANGE. No change to Boston and New England cities.

Baggage Checked Through to All Points East

☞Through Tickets and information regarding the route can be obtained at the Union Ticket Office, corner Bank and Superior streets; at office 131 Bank street, and at new Depot of New York, Pennsylvania and Ohio Railway, South Water street and Viaduct, Cleveland.

A. E. CLARK, Gen. Pass'r. Agt., Cleveland, Ohio.

J. M. FERRIS, Gen. Man'gr, Cleveland

M. L. FOUTS, Pass. Agt., 131 Bank st., Cleveland.

THE NICKEL PLATE.

New York, Chicago & St. Louis Railroad.

The passenger equipment of this new trunk line is all new and is supplied with the latest appliances necessary to safe, speedy and comfortable travel.

Following is the time in effect January 21, 1883, and until further notice:

GOING EAST.

	Local Pass'n'gr	Local Pass'ngr.	Con'eau Accom.
Lv. Chicago	8 10 am	.....	.....
Ar. Valparaiso	9 57	.....	.....
" Ft. Wayne	1 30 pm	.....	.....
" New Haven	2 05	.....	.....
" West Leipsic	4 09	.....	.....
" Arcadia	5 10	.....	.....
" Fostoria	5 25	.....	.....
" Gr. Springs	6 12	.....	.....
" Bellevue	6 40	.....	.....
Lv Bellevue	6 50	7 30 am	.....
Ar Cleveland	9 20 pm	10 00	.....
Lv Cleveland	.....	10 05	4 30 pm
Ar Painesville	.....	11 11	5 45
" Ashtabula	.....	12 03 pm	6 37
" Conneaut	.....	12 30	7 05
" Erie	.....	1 34	.....
" Dunkirk	.....	3 15	.....
" Buffalo	.....	5 00	.....

GOING WEST.

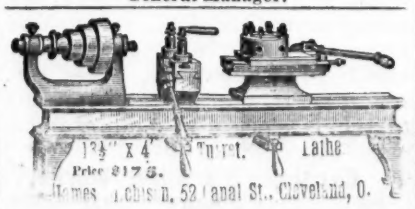
	Local Passn'gr.	Local Pass'ng r.	Con'eau Accom.
Lv Buffalo	8 00 am	.....	.....
Ar Dunkirk	9 45	.....	.....
" Erie	11 31	.....	Leave.
" Conneaut	12 35 pm	.....	6 30 am
" Ashtabul	1 07	.....	7 00
" Painesville	2 00	.....	7 55
" Cleveland	3 13	.....	9 10
Lv Cleveland	3 18	7 00 am	.....
Ar Bellevue	5 45	9	.....
Lv Bellevue	.....	9	.....
Ar Gr. Springs	.....	9	.....
" Fostoria	.....	10	.....
" Arcadia	.....	10	.....
" West Leipsic	.....	11 58 pm	.....
" New Haven	.....	2 05	.....
" Ft Wayne	.....	2 20	.....
" Valparaiso	.....	6 25	.....
" Chicago	.....	8 17	.....

Trains run by Columbus time, which is twenty minutes later than Chicago, five minutes earlier than Cleveland, and sixtenn minutes earlier than Buffalo time.

For rates or information, call on nearest Agent of the Company or address

HENRY MONETT, Gen'l Passenger Agent, Hoyt Block, cor. St. Clair and Bank streets,

LEWIS WILLIAMS, General Manager. Cleveland, O.



M. GAUNT,

Manufacturer of

AUGERS AND MACHINE BITS,

All goods manufactured at my establishment are guaranted A1.

Factory—22 East South Street.

21 INDIANAPOLIS, IND.

Bee Line.

Cleveland, Columbus, Cincinnati & Indianapolis Railway.

The Great Central Trunk Route to the Ohio and Mississippi Rivers.

Three Trains Week Days,

TWO TRAINS SUNDAY.

Leave Cleveland with Through Palace Coaches and Elegant Sleeping Cars for

Columbus, Cincinnati, Indianapolis, Terre Haute and St. Louis

Without Change.

This is the only line making Direct Connection with all the principal Trunk Lines of the East for all Southern, Southwestern and Western points, either by way of Cincinnati, Indianapolis or St. Louis for all railway towns in Missouri, Arkansas, Texas, Kansas, Nebraska, Colorado, New Mexico, Old Mexico and the Pacific Coast.

Equipment New and Comprising all Modern Improvements.

The Best Roadbed and Safest Road in the West.

Tickets by this popular route for sale at all regular ticket offices.

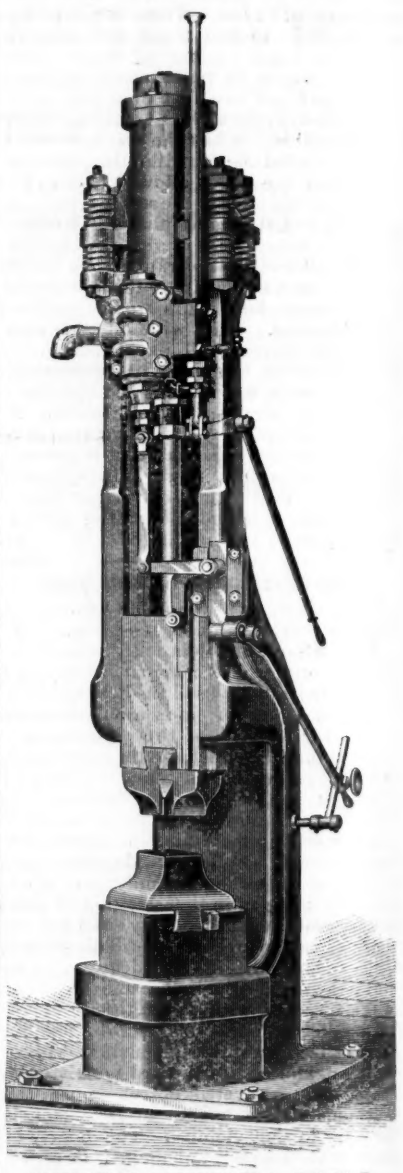
E. B. Thomas, General Manager. **O. B. Skinner,** Traffic Manager.

A. J. Smith, Gen'l Pass. Agent, CLEVELAND, O.

W. S. IDE, Pres. R. T. CLARKE, Man'g'r.

Vulcan Iron Works Company,

BUILDERS OF



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COLUMBUS, OHIO.

Specialties: Steam Drop Hammers, Power Punches and Shears, Steam Hammers, Power Hammers.

Circulars, Photographs, Testimonials and Prices furnished on application.

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THE
Noteman Rotary Engine
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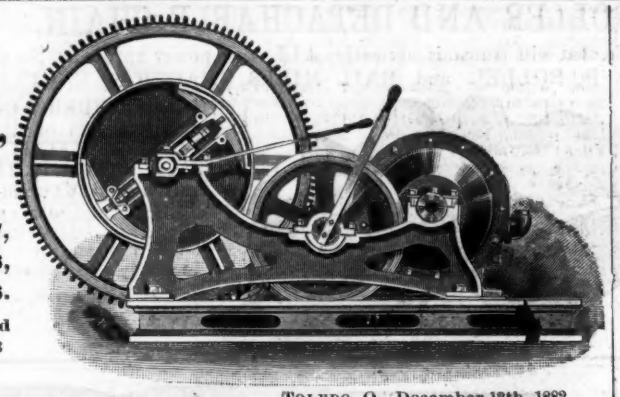
TOLEDO, O.
Manufacture
Hoisting Machinery,
Stationary Engines,
High Speed Engines.
For Specialties Send for Circulars. 03



TOLEDO, O., December 13th, 1882.

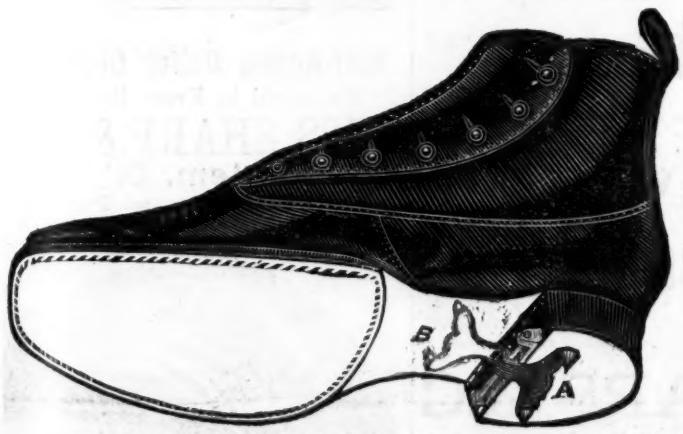
THE NOTEMAN ROTARY ENGINE AND PUMP CO.,
Gentlemen—Your Engine used for pumping when sinking cassons for the piers of the Wheeling and Lake Erie Bridge, gave good satisfaction. I consider your engine for general use the best made, and have no hesitancy in recommending it to contractors and builders.
J. G. KANEY, Chief Engineer W. & L. E. Bridge Co.

LEETONIA BOILER WORKS,
Manufacturers of All Kinds of
Boilers, Blast Furnace Stacks, Oil Tanks, Plate and
SHEET IRON WORK.
Prompt Attention Given to Repairing.
Leetonia, Ohio. 74

H. B. HUNT,
Manufacturer and Wholesale Dealer in
TIN & JAPANNED WARES,
TEA, COFFEE AND SPICE CADDIES
White Lead, Varnish and Oil Cans,
Pieced Ware of every description.
STREET LANTERNS FOR GAS, OIL AND GASOLINE A SPECIALTY.
57 PROSPECT ST. FACTORY, 14, 16, 18 & 20 HICKOX ST.
CLEVELAND. 3

M. D. LEGGETT & CO.
ATTORNEYS AT LAW,
City Hall, Cleveland, O.
M. D. LEGGETT, Ex-Commissioner of Patents.
L. L. LEGGETT.
They obtain United States and Foreign Patents; prosecute and defend in suits for infringements in the U. S. Courts, make searches and render opinins as to the validity of Patents, and examine machinery to determine whether the same infringe patents. 7tf

The Improved "Climax" Reversible Ice Creeper.
CHILDS, GROFF & COMPANY,
MANUFACTURERS, CLEVELAND, OHIO.



Patented April 30, 1878.
Perfect Safety Secured in Walking on Icy or Slippery Pavements.

A represents the Creeper in position ready for use The dotted line, B, shows the Creeper thrown back entirely out of the way when not in use, or walking in doors.
THIS CREEPER HAS ADVANTAGES OVER ALL OTHERS.
Its simplicity of construction, being easily adjusted, always ready for use, and when not needed, can be instantly turned under the 'shank' out of the way, therefore not interfering with walking in the house on carpets, etc. When in position for walking on ice, it is sure protection from falling. For sale by hardware and shoe dealers generally. 9

AKRON IRON CO.,
AKRON, O.
Patent Hot Polished Shafting.
Superior to any shafting in market for the following reasons, viz.: 1st.—It is perfectly straight and round. 2d.—It can be rolled accurately to any desired gauge. 3d.—It has the beautiful blue finish of Russia Sheet Iron, rendering it less liable to rust or tarnish than shafting of the ordinary finish. 4th. It will not spring or warp in key seating like most of the other manufactured shafting sold in the market, and, as a consequence, is admirably adapted for line and counter shafting. 5th. The surface is composed of magnetic oxide of iron, forming a superior journal or bearing surface. 6th. It is made of superior stock.
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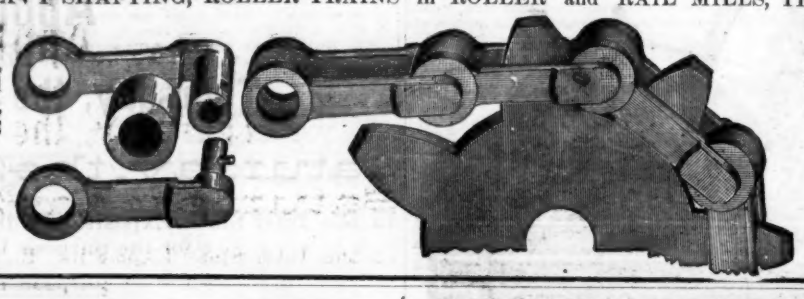

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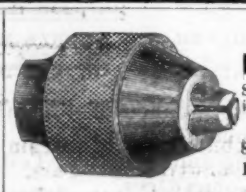

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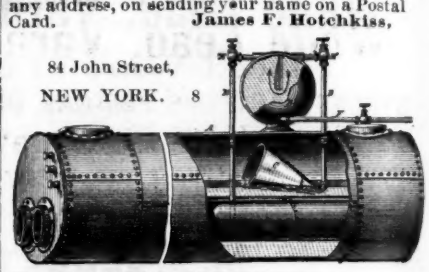

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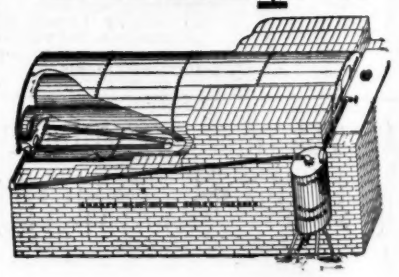

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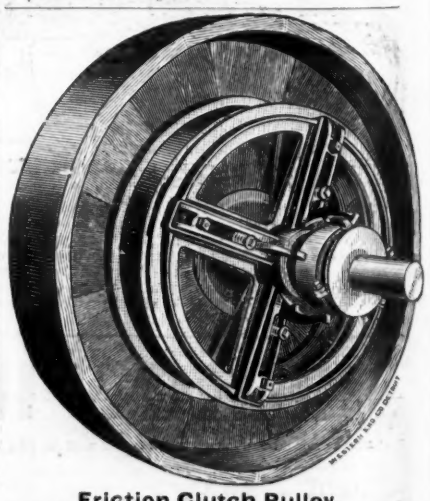

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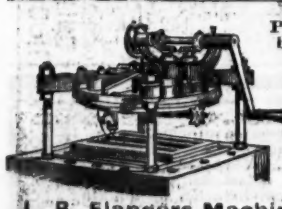

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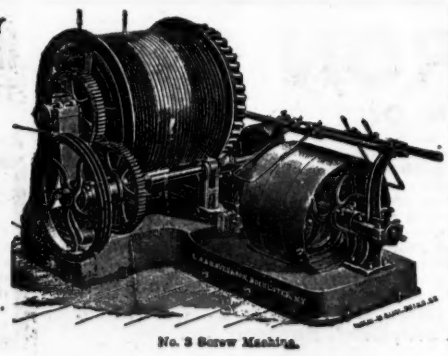

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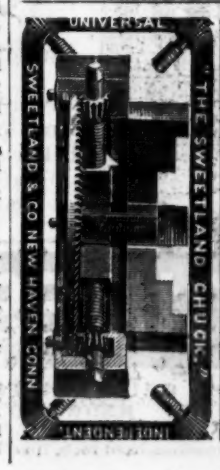

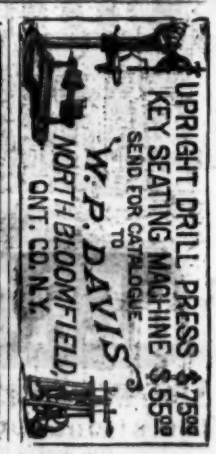

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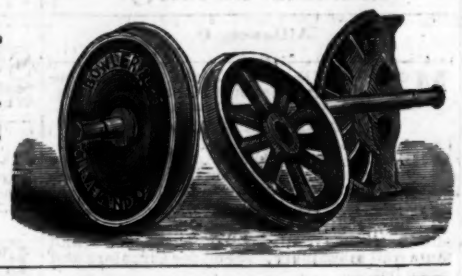

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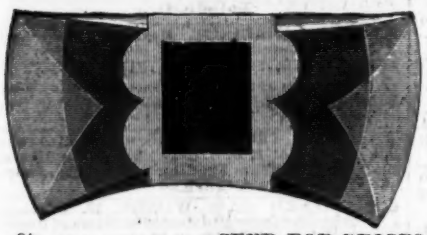

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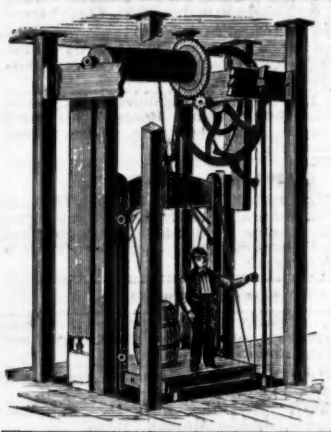

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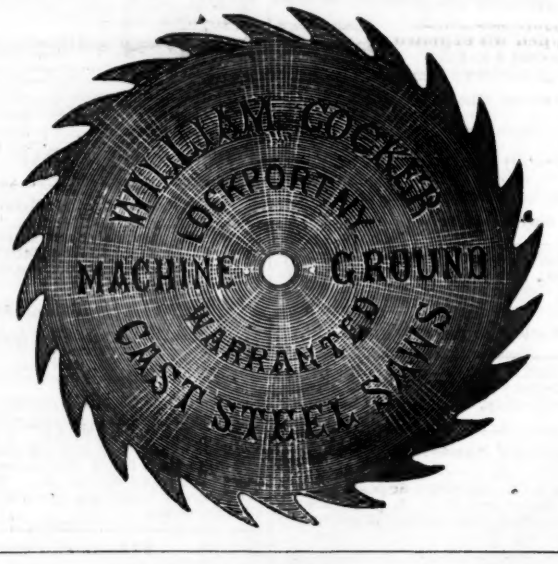

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